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AFATL-TR-75-87, VOLUME II

EXTERNAL STORE AIRLOADS PREDICTION TECHNIQUE.

VOLUME II. DETAILED DATA.

BOOK 4. MER CARRIAGE NORMAL FORCE AND PITCHING MOMENT PREDICTIONS.

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FINAL REPORT, JANUARY 1973 – JUNE 1975

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AIR FORCE ARMAMENT LABORATORY
AIR FORCE SYSTEMS COMMAND • UNITED STATES AIR FORCE
EGLIN AIR FORCE BASE, FLORIDA

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4.3 NORMAL FORCE

4.3.1 Basic Airload

The basic captive store airload is that airload generated by a zero-yaw pitch excursion of the parent aircraft.

4.3.1.1 Slope Prediction

The prediction of captive store normal force as a function of angle of attack, $\left(\frac{NF}{q}\right)_\alpha$, is divided into two sections, fuselage centerline store configurations and wing-mounted store configurations. The technique presented in this section predicts the normal force slope, $\left(\frac{NF}{q}\right)_\alpha$, at M = 0.5.

FUSELAGE CENTERLINE-MOUNTED STORES

MER STATIONS 1-6 (MS1-6):

$$\left(\frac{NF}{q}\right)_{\substack{\alpha \\ PRED \\ MS1-6}} = C_{N_{\alpha_{\mathfrak{L}}}} \underset{MS1-6}{} \quad S_{REF} = f(d)$$

where:

$C_{N_{\alpha_{\mathfrak{L}}}}$ - Variation of C_{N_α} as a function of store diameter, $\frac{1}{deg}$.

MER STA 1 - Figure 537
MER STA 2 - Figure 537
MER STA 3 - Figure 538
MER STA 4 - Figure 538
MER STA 5 - Figure 538
MER STA 6 - Figure 538

S_{REF} - Store reference area, $\frac{\pi d^2}{4}$, ft^2.

WING-MOUNTED STORES

MER STATIONS 1 and 2 (MS1,2):

$$\left(\frac{NF}{q}\right)_{\substack{\alpha \\ PRED \\ MS1,2}} = \left[K_{C_{NF}} \left(\frac{NF}{q}\right)_{\substack{\alpha \\ ISO \\ MS1,2}} + \Delta C_{N_{\substack{\alpha \\ BUOY \\ MS1,2}}} K_{\frac{\ell_{LE_F}}{C}} \frac{PPA}{845}\right] K_{\Lambda_2}$$

where:

$K_{C_{NF}} \left(\frac{NF}{q}\right)_{\substack{\alpha \\ ISO}}$ - Initial normal force slope prediction, $\frac{ft^2}{deg}$, see Subsection 2.3.2.

$\Delta C_{N_{\substack{\alpha \\ BUOY}}}$ - Incremental C_{N_α} due to buoyancy effect presented as a function of C_{LOCAL}/K_{Λ_2}, $\frac{1}{deg}$.

MER STA 1 - Figure 539

MER STA 2 - Figure 539

$K_{\frac{\ell_{LE_F}}{C}}$ - Correction factor based on the distance from the wing leading edge to the nose of the store on MER STATION 2 measured in the wing plan view, divided by the local chord, positive, Figure 540.

PPA - Store total plan projected area, in^2., defined in Subsection 2.2.2.

K_{Λ_2} - Aircraft wing sweep correction factor, $\frac{\cos \Lambda}{\cos 45^\circ}$

MER STATIONS 3 and 6 (MS3,6):

$$\left(\frac{NF}{q}\right)_{\substack{\alpha \\ PRED \\ MS3 \\ MS6}} = \left[K_{C_{NF}} \left(\frac{NF}{q}\right)_{\substack{\alpha \\ ISO \\ MS1 \\ MS2}} + \Delta C_{N_{\substack{\alpha \\ MS3 \\ MS6}}} K_{SCALE_{NF}}\right] K_{\Lambda_2}$$

where:

$K_{C_{NF}}\left(\frac{NF}{q}\right)_{\alpha}_{ISO}$ - Defined under MS1, 2 above, $\frac{ft^2}{deg}$.

ΔC_{N_α} - Incremental C_{N_α} presented as a function of C_{LOCAL}/K_{Λ_2}, $\frac{1}{deg}$.

MER STA 3 - Figure 541

MER STA 6 - Figure 542

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Defined under MS1, 2 above

MER STATION 4 (MS4):

$$\left(\frac{NF}{q}\right)_{\alpha}_{PRED}_{MS4} = \left[K_{C_{NF}}{}_{MS2}\left(\frac{NF}{q}\right)_{\alpha}_{ISO} + \left(\frac{\Delta C_{N_\alpha}}{K_{\Lambda_2}}\right)_{MS4} K_{SCALE_{NF}} K_{\Lambda_2}\right] K_{\Lambda_2}$$

where:

$K_{C_{NF}}\left(\frac{NF}{q}\right)_{\alpha}_{ISO}$ - Defined under MS1, 2 above, $\frac{ft^2}{deg}$.

$\frac{\Delta C_{N_\alpha}}{K_{\Lambda_2}}$ - Incremental C_{N_α} presented as a function of C_{LOCAL}/K_{Λ_2}, $\frac{1}{deg.}$, Figure 542.

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Defined under MS1, 2 above.

MER STATION 5 (MS5):

$$\left(\frac{NF}{q}\right)_{\substack{\alpha \\ PRED \\ MS5}} = \left[K_{C_{NF}} \left(\frac{NF}{q}\right)_{\substack{\alpha \\ ISO}} + \left(\Delta C_{N_{\alpha}} K_{\Lambda_2}{}^2\right) \frac{K_{SCALE_{NF}}}{K_{\Lambda_2}{}^2}\right] K_{\Lambda_2}$$

where:

$K_{C_{NF}} \left(\frac{NF}{q}\right)_{\substack{\alpha \\ ISO}}$ - Defined under MS1, 2 above, $\frac{ft^2}{deg}$.

$\Delta C_{N_{\alpha}} K_{\Lambda_2}{}^2$ - Incremental $C_{N_{\alpha}}$ presented as a function of C_{LOCAL}/K_{Λ_2}, $\frac{1}{deg}$, Figure 541.

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Defined under MS1, 2 above

A numerical example illustrating a similar calculation procedure is presented in Subsection 4.1.1.1.

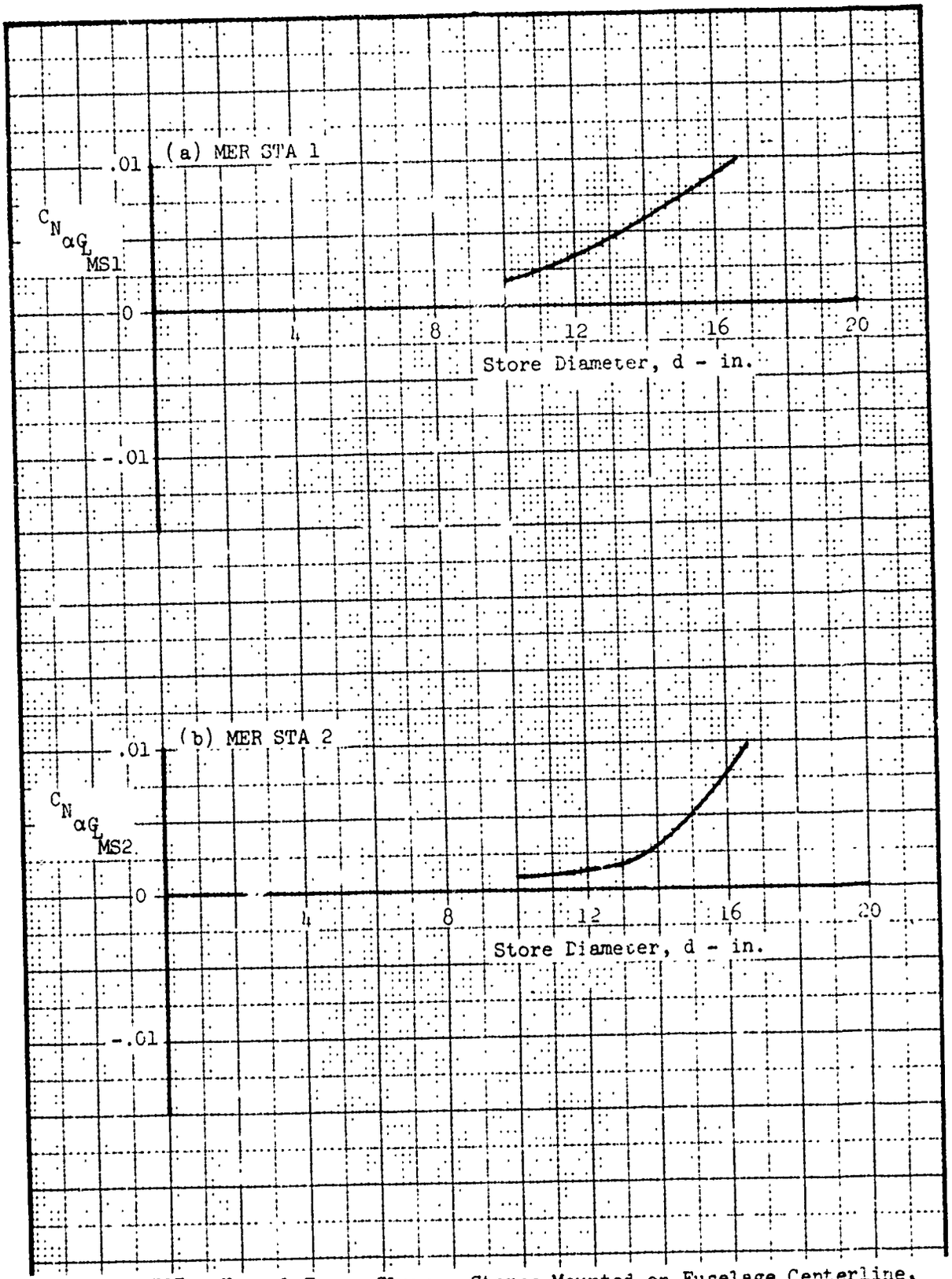


Figure 537. Normal Force Slope - Stores Mounted on Fuselage Centerline, MER Stations 1 and 2

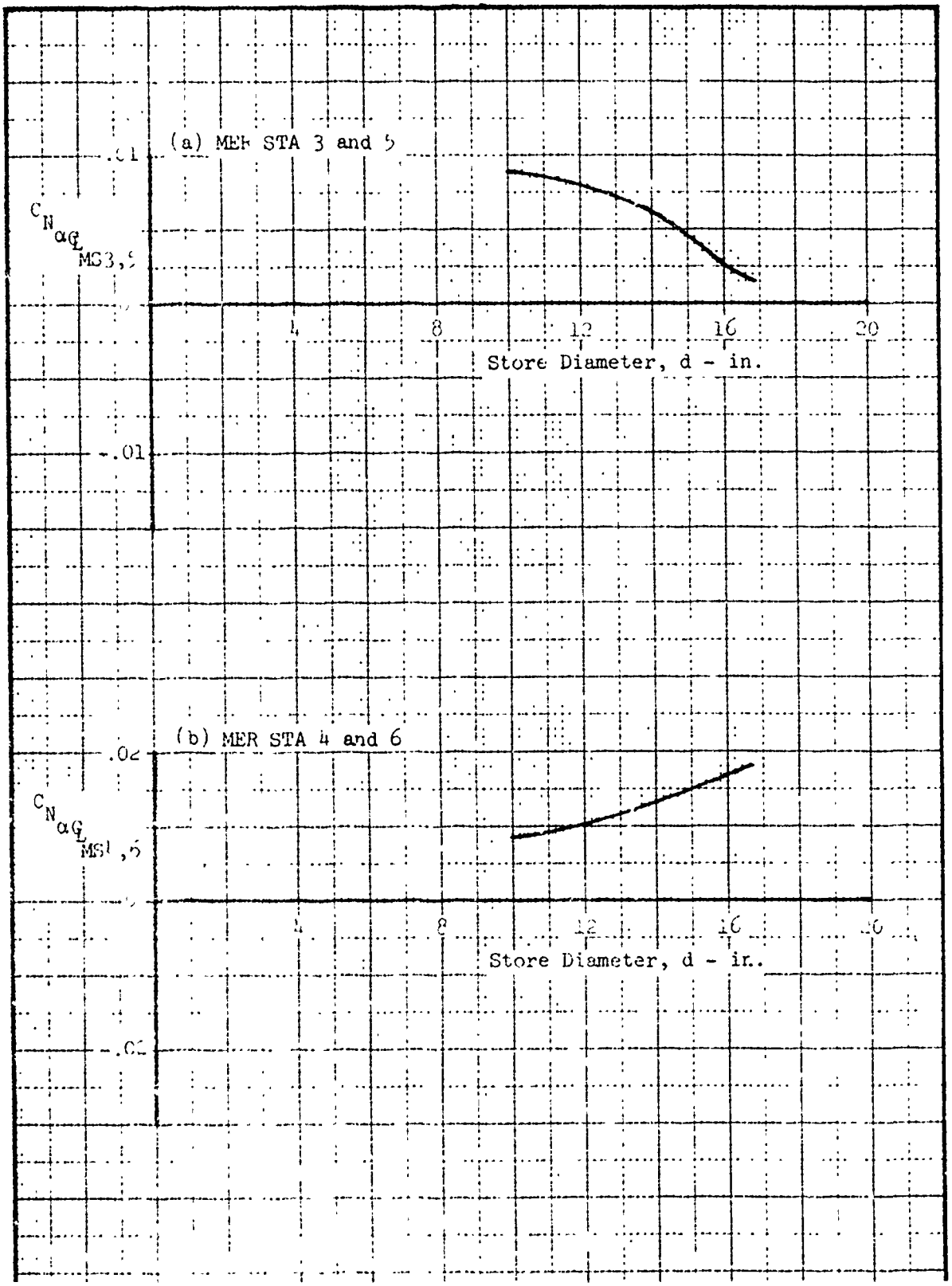


Figure 58. Normal Force Slope - Stores Mounted on Fuselage Centerline, MER Stations 3-6

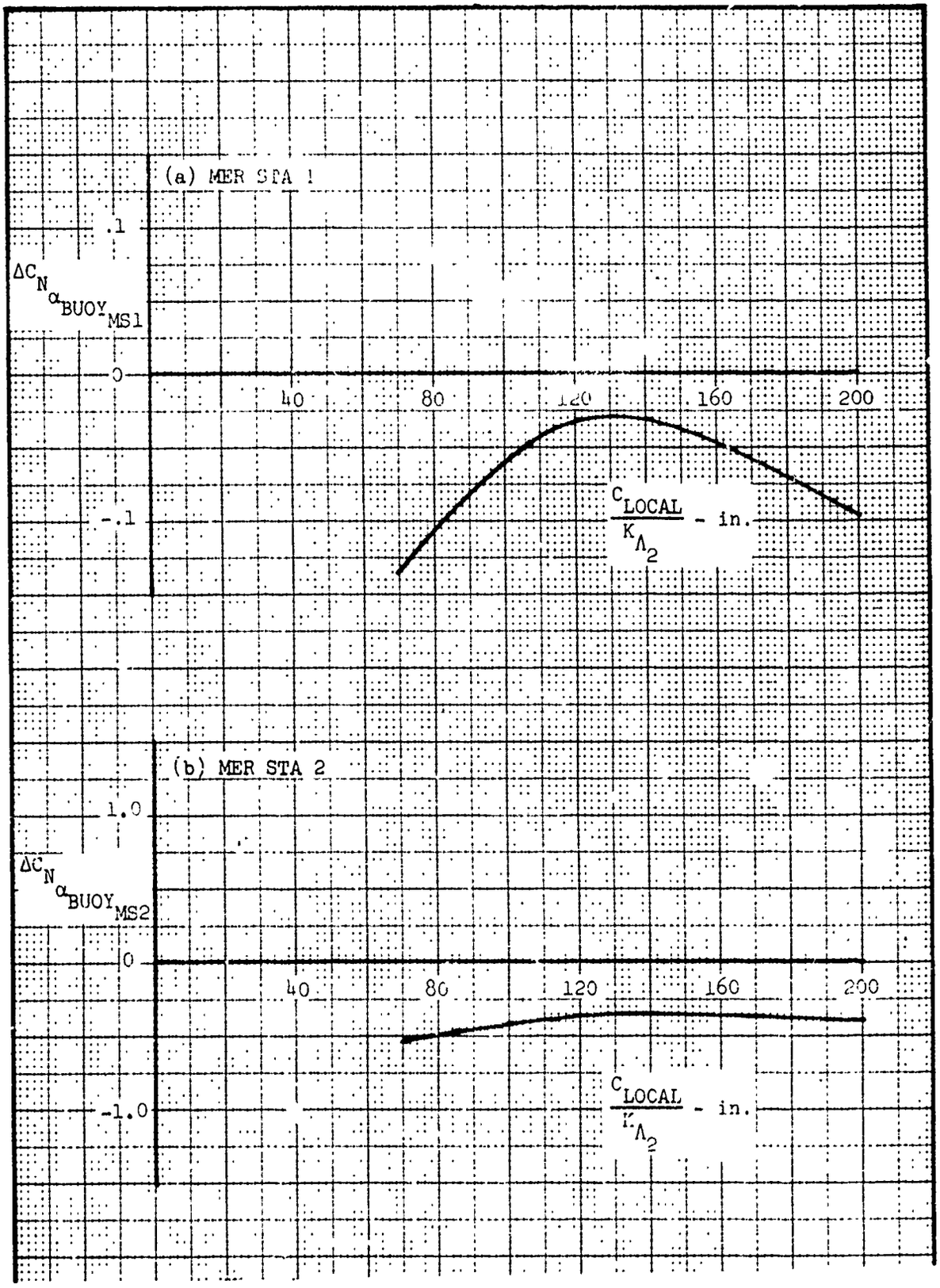


Figure 539. Normal Force Slope-Buoyancy Correction for MER Stations 1 and 2

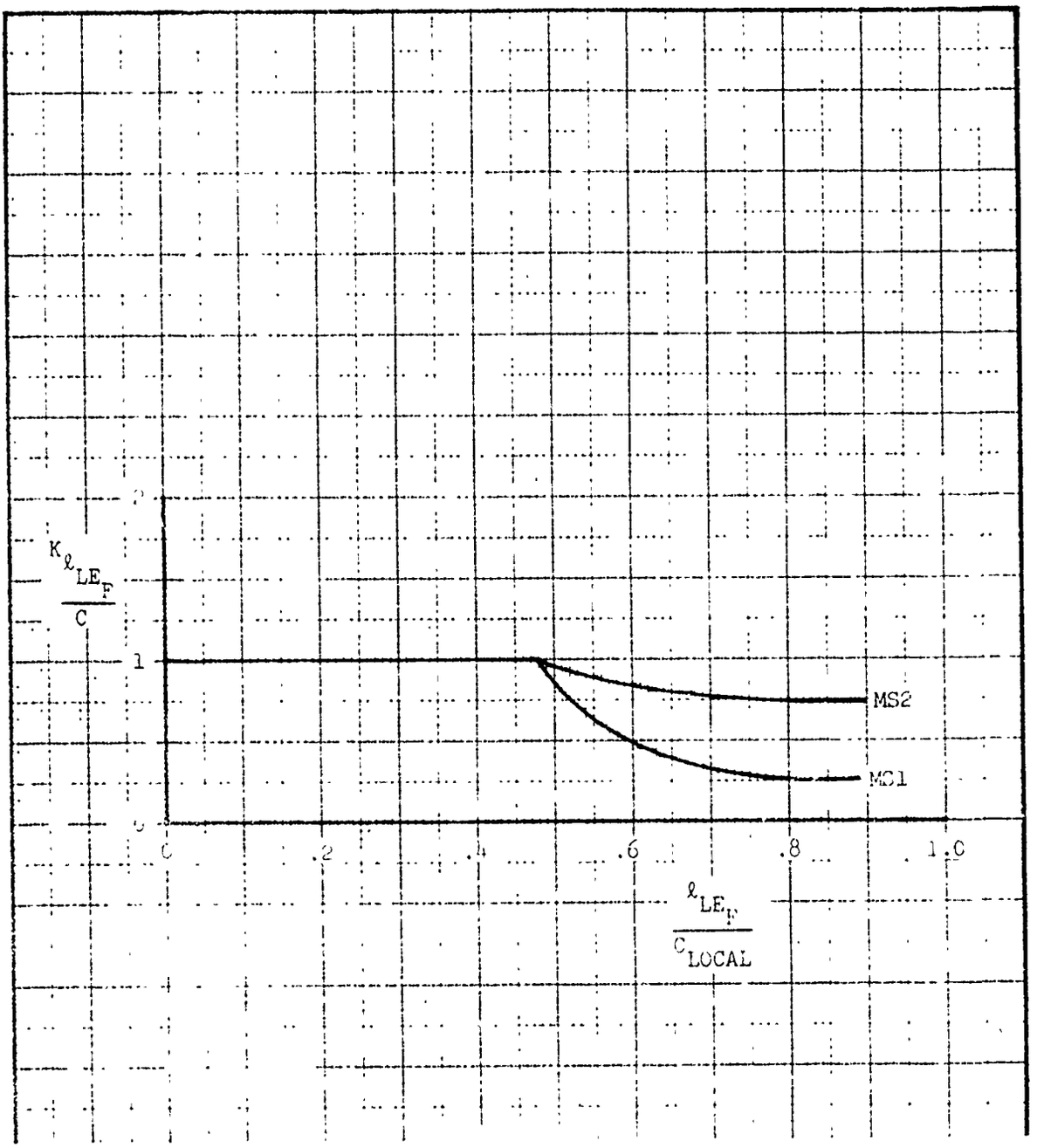


Figure 540 Normal Force Slope - Chordwise Position Correction for MER Stations 1 and 2

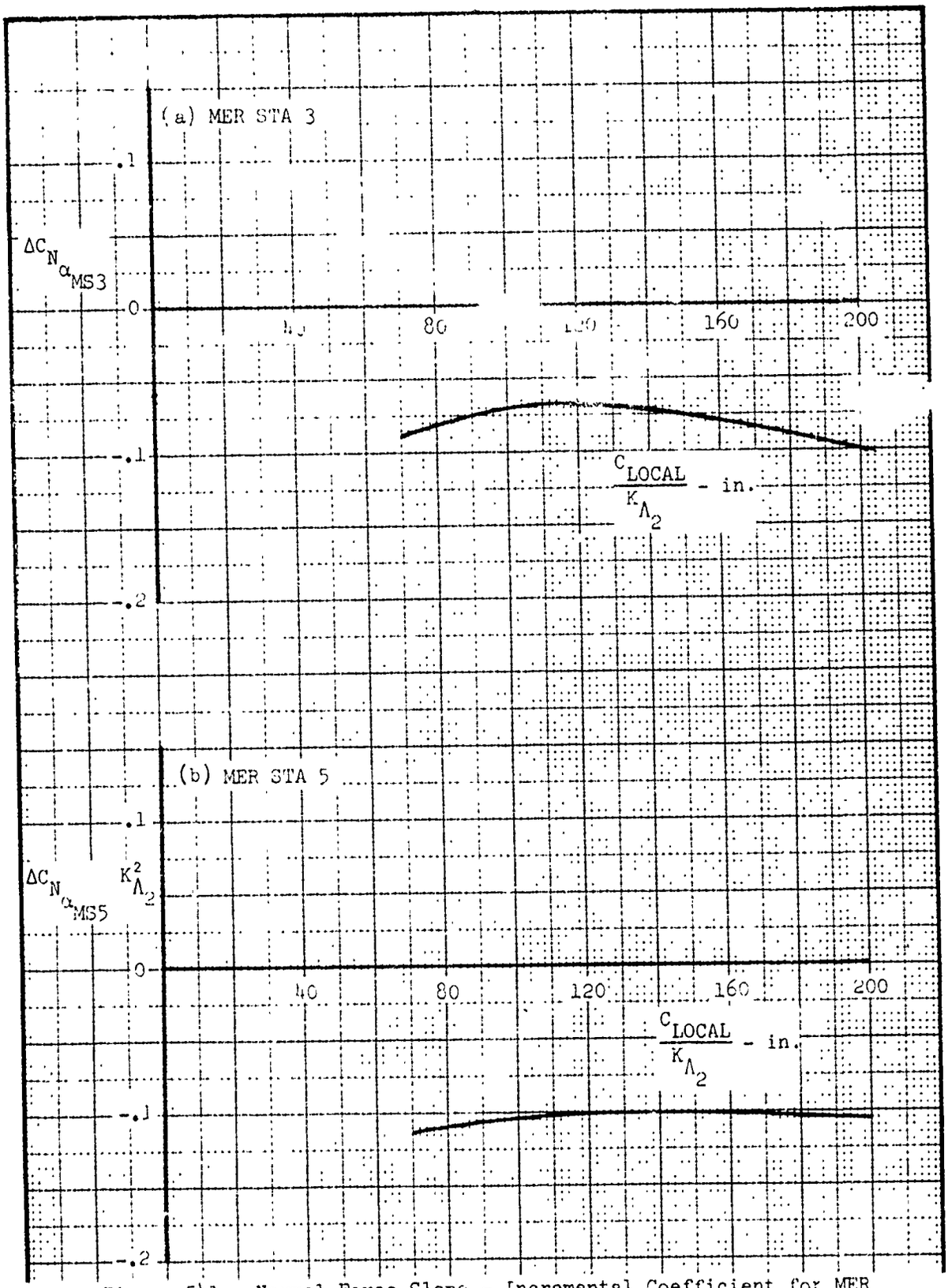


Figure 541. Normal Force Slope - Incremental Coefficient for MER Stations 3 and 5

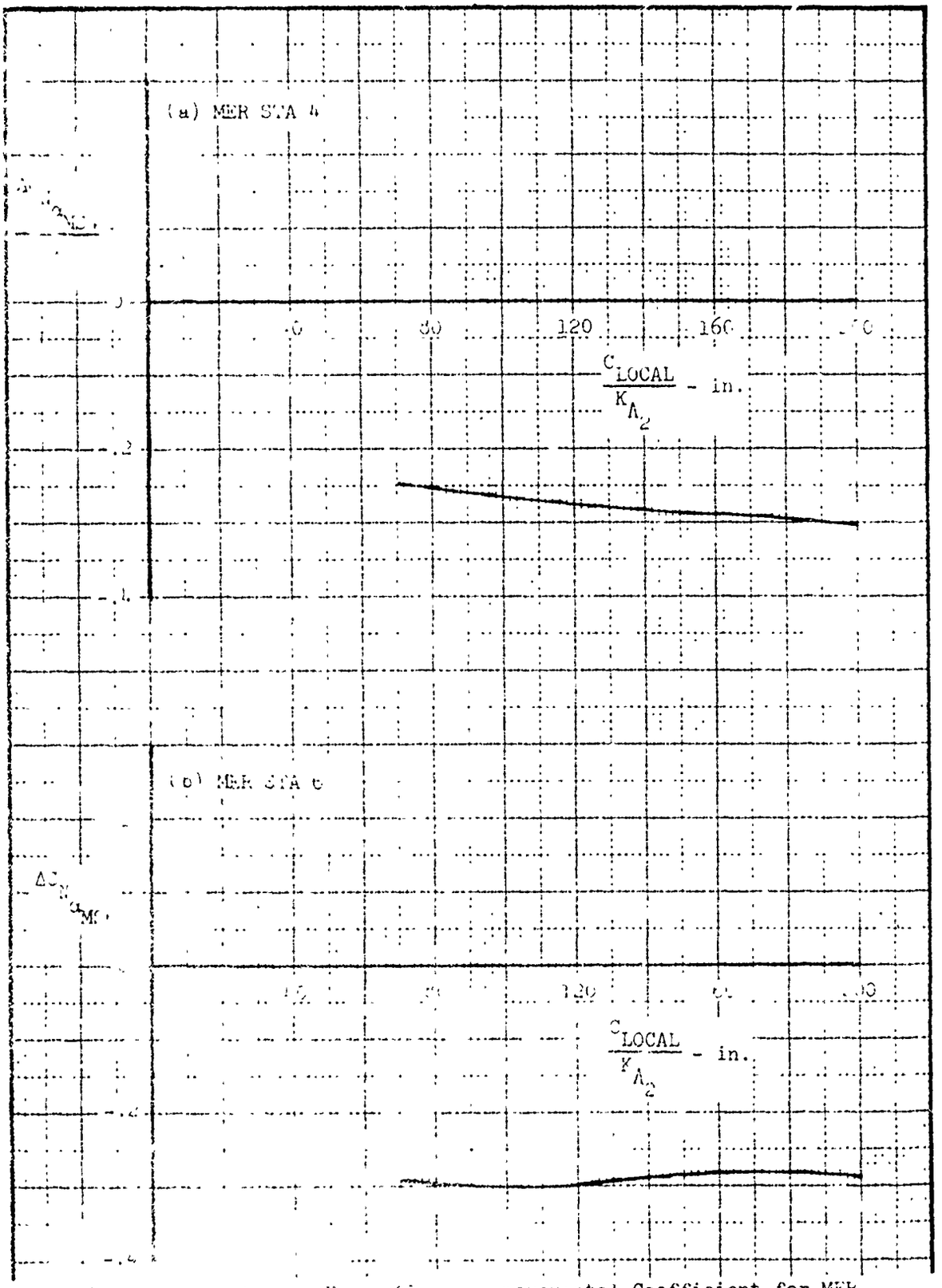


Figure . Normal Force Type Incremental Coefficient for MER
Station [illegible]

4.3.1.2 Slope Mach Number Correction

To compute the variation in normal force slope, $\left(\frac{NF}{q}\right)_\alpha$, between M = 0.5 and 1.6, use the following relationship.

$$\left(\frac{NF}{q}\right)_{\substack{\alpha \\ M=x}} = \left(\frac{NF}{q}\right)_{\substack{\alpha \\ PRED}} + \Delta\left(\frac{NF}{q}\right)_{\substack{\alpha \\ M=x}}$$

where:

$\left(\frac{NF}{q}\right)_{\substack{\alpha \\ PRED}}$ - Normal force slope predicted at M = 0.5.

$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha \\ M=x}}$ - Increment in normal force slope at M = x.

FUSELAGE CENTERLINE-MOUNTED STORES

MER STATIONS 1 - 6 (MS1-6):

$$\left(\frac{NF}{q}\right)_{\substack{\alpha_{\mathfrak{L}} \\ M=x \\ MS1-6}} = \left(\frac{NF}{q}\right)_{\substack{\alpha_{\mathfrak{L}} \\ PRED}} + \Delta C_{N_{\substack{\alpha_{\mathfrak{L}} \\ MS1-6}}} K_{SCALE_{NF}}$$

where:

$\left(\frac{NF}{q}\right)_{\substack{\alpha_{\mathfrak{L}} \\ PRED}}$ - Value predicted at M = 0.5 from Subsection 4.3.1.1, $\frac{ft^2}{deg}$.

$\Delta C_{N_{\alpha_{\mathfrak{L}}}}$ - Incremental C_{N_α} presented as a function of Mach number, $\frac{1}{deg}$.

MER STA 1 - Figure 544
MER STA 2 - Figure 544
MER STA 3 - Figure 544
MER STA 4 - Figure 544
MER STA 5 - Figure 544
MER STA 6 - Figure 544

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

WING-MOUNTED STORES

A generalized curve depicting the normal force slope variation with Mach number is shown in Figure 543.

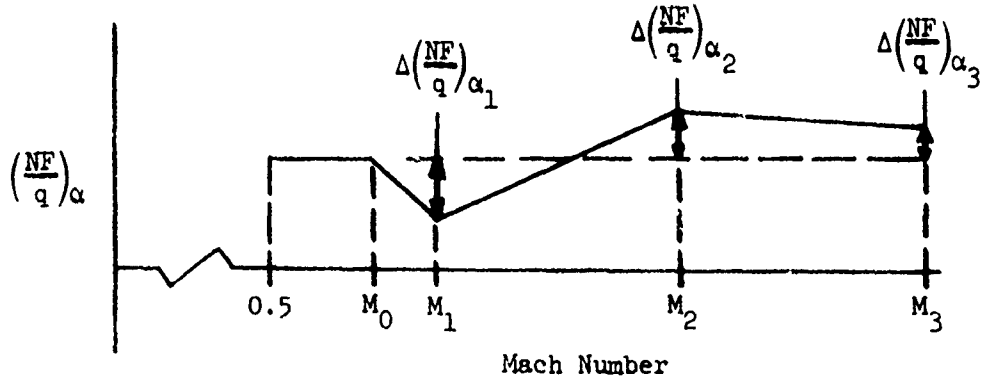


Figure 543. Normal Force Slope - Generalized Mach Number Variation

The slope variation with Mach number has been approximated by a series of linear segments with break points occurring at Mach numbers defined by M_0, M_1, M_2, and M_3. The variation of the Mach break points is presented in Figure 545, 546, and 547 for each of the six MER stations as a function of C_{LOCAL}/K_{Λ_2}. M_0 is the Mach number where the slope initially deviates from the slope predicted at M = 0.5. Equations have been developed to predict the delta (incremental) slope change from that predicted at M = 0.5 for each of the remaining Mach break points (M_1, M_2, etc.) for each of the six MER stations. These equations are presented below.

BREAK 1 (1):

MER STATIONS 1, 2, 3 and 5 (MS1,2,3,5):

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha_1 \\ MS1,2,3,5}} = \left[\Delta C_{N_{\substack{\alpha_1 \\ MS1,2,3,5}}} + \Delta C_{N_{\substack{\alpha_1 \\ INTF \\ MS1,2,3,5}}}\right] K_{SCALE_{NF}} K_{\Lambda_2}$$

where:

$\Delta C_{N_{\alpha_1}}$ - Incremental C_{N_α} at $M=M_1$ presented as a function of C_{LOCAL}/K_{Λ_2}, $\frac{1}{deg}$.

MER STA 1 - Figure 548
MER STA 2 - Figure 548
MER STA 3 - Figure 549
MER STA 5 - Figure 549

$\Delta C_{N_{\substack{\alpha_1 \\ INTF}}}$ - Incremental C_{N_α} due to the interference effect of the fuselage for high wing aircraft, $\frac{1}{deg}$.

MER STA 1 - Figure 550
MER STA 2 - Figure 550
MER STA 3 - Figure 550
MER STA 5 - Figure 550

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Wing sweep correction factor, $\frac{\cos \Lambda}{\cos 45^\circ}$, where Λ is the quarter-chord sweep angle of the aircraft wing.

MER STATIONS 4 and 6 (MS4,6):

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha_1 \\ MS4,6}} = \Delta C_{N_{\substack{\alpha_1 \\ MS4,6}}} K_{SCALE_{NF}} K_{\Lambda_2}$$

where:

$\Delta C_{N_{\alpha_1}}$ - Incremental C_{N_α} at $M=M_1$ presented as a function of C_{LOCAL}/K_{Λ_2}, $\frac{1}{deg.}$

MER STA 4 - Figure 551

MER STA 6 - Figure 551

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Defined above.

Break 2 (M_2):

MER STATIONS 1, 2, 3, and 5 (MS1, 2, 3, 5):

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha_2 \\ MS1,2,3,5}} = \left[\Delta C_{N_{\substack{\alpha_2 \\ MS1,2,3,5}}} + \Delta C_{N_{\substack{\alpha_2 \\ INTF \\ MS1,2,3,5}}}\right] K_{SCALE_{NF}} K_{\Lambda_2}$$

where:

$\Delta C_{N_{\alpha_2}}$ - Defined the same as in Break 1, $\frac{1}{deg}$.

MER STA 1 - Figure 552

MER STA 2 - Figure 552

MER STA 3 - Figure 553

MER STA 5 - Figure 553

$\Delta C_{N_{\alpha_2}}$ - Defined the same as in Break 1, $\frac{1}{deg}$.

$_{INTF}$ MER STA 1 - Figure 554

MER STA 2 - Figure 554

MER STA 3 - Figure 554

MER STA 4 - Figure 554

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Defined in Break 1.

MER STATIONS 4 and 6 (MS4,6):

$$\Delta\left(\frac{NF}{q}\right)_{\alpha_2}{}_{MS4,6} = \Delta C_{N_{\alpha_2}}{}_{MS4,6} K_{SCALE_{NF}} K_{\Lambda_2}$$

where:

$\Delta C_{N_{\alpha_2}}$ - Defined the same as in Break 1, $\frac{1}{deg}$.

MER STA 4 - Figure 555

MER STA 6 - Figure 555

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Defined in Break 1

Break 3 (M_3):

MER STATIONS 1, 2, 3, and 5 (MS1, 2, 3, 5):

$$\Delta\left(\frac{NF}{q}\right)_{\alpha_3}{}_{MS1,2,3,5} = [\Delta C_{N_{\alpha_3}}{}_{MS\ 1,2,3,5} + \Delta C_{N_{\alpha_3}}{}_{INTF\ MS1,2,3,5}] K_{SCALE_{NF}} K_{\Lambda_2}$$

where:

$\Delta C_{N_{\alpha_3}}$ - Defined the same as in Break 1, $\frac{1}{deg}$.

MER STA 1 - Figure 556
MER STA 2 - Figure 556
MER STA 3 - Figure 557
MER STA 5 - Figure 557

$\Delta C_{N_{\alpha_{3_{INTF}}}}$ - Defined the same as in Break 1, $\frac{1}{deg}$.

MER STA 1 - Figure 558
MER STA 2 - Figure 558
MER STA 3 - Figure 558
MER STA 5 - Figure 558

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Defined in Break 1

MER STATIONS 4 and 6 (MS4,6):

At Break 3

To compute $\left(\frac{NF}{q}\right)_\alpha$ at M = x, first determine from Figures 545, 546, or 547 between which Mach number break points M = x occurs. Let M_{LOW} be the lower Mach break and M_{HI} be the higher Mach break. Compute $\left(\frac{NF}{q}\right)_\alpha$ at M = x from the expression below.

$$\left(\frac{NF}{q}\right)_{\substack{\alpha \\ M=x}} = \left(\frac{NF}{q}\right)_{\substack{\alpha \\ PRED}} + \Delta\left(\frac{NF}{q}\right)_{\substack{\alpha \\ M_{LOW}}} + \left(\frac{x - M_{LOW}}{M_{HI} - M_{LOW}}\right)\left[\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha \\ M_{HI}}} - \Delta\left(\frac{NF}{q}\right)_{\substack{\alpha \\ M_{LOW}}}\right]$$

If $x \leq M_0$, $\left(\frac{NF}{q}\right)_{\substack{\alpha \\ M=x}}$ will be the value obtained in Subsection 4.3.1.1 (the initial term in the above equation).

A numerical example illustrating the application of the above equation is presented in Subsection 4.1.1.2.

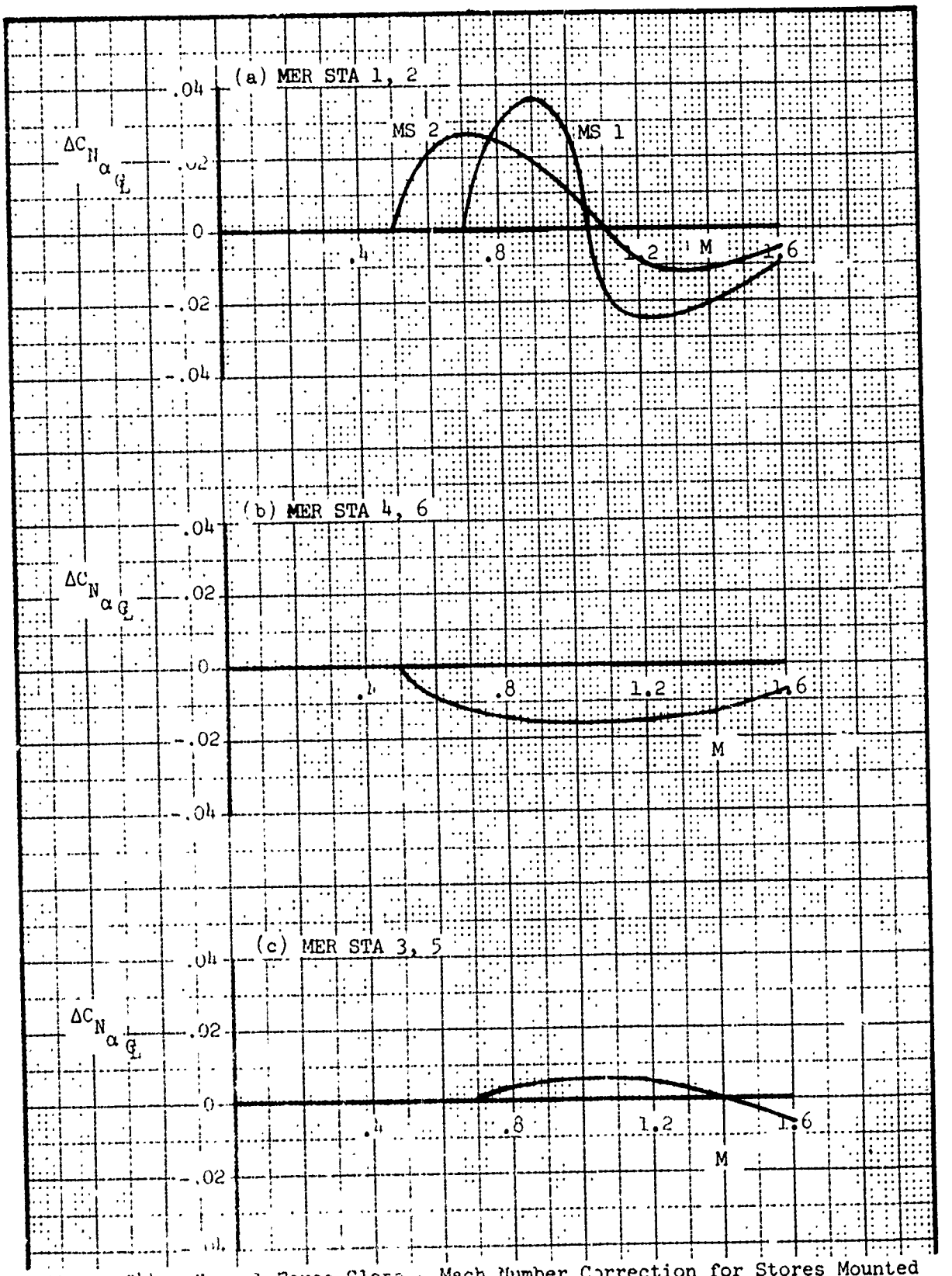


Figure 5.4. Normal Force Slope - Mach Number Correction for Stores Mounted on Fuselage Centerline, MER Stations 1-6

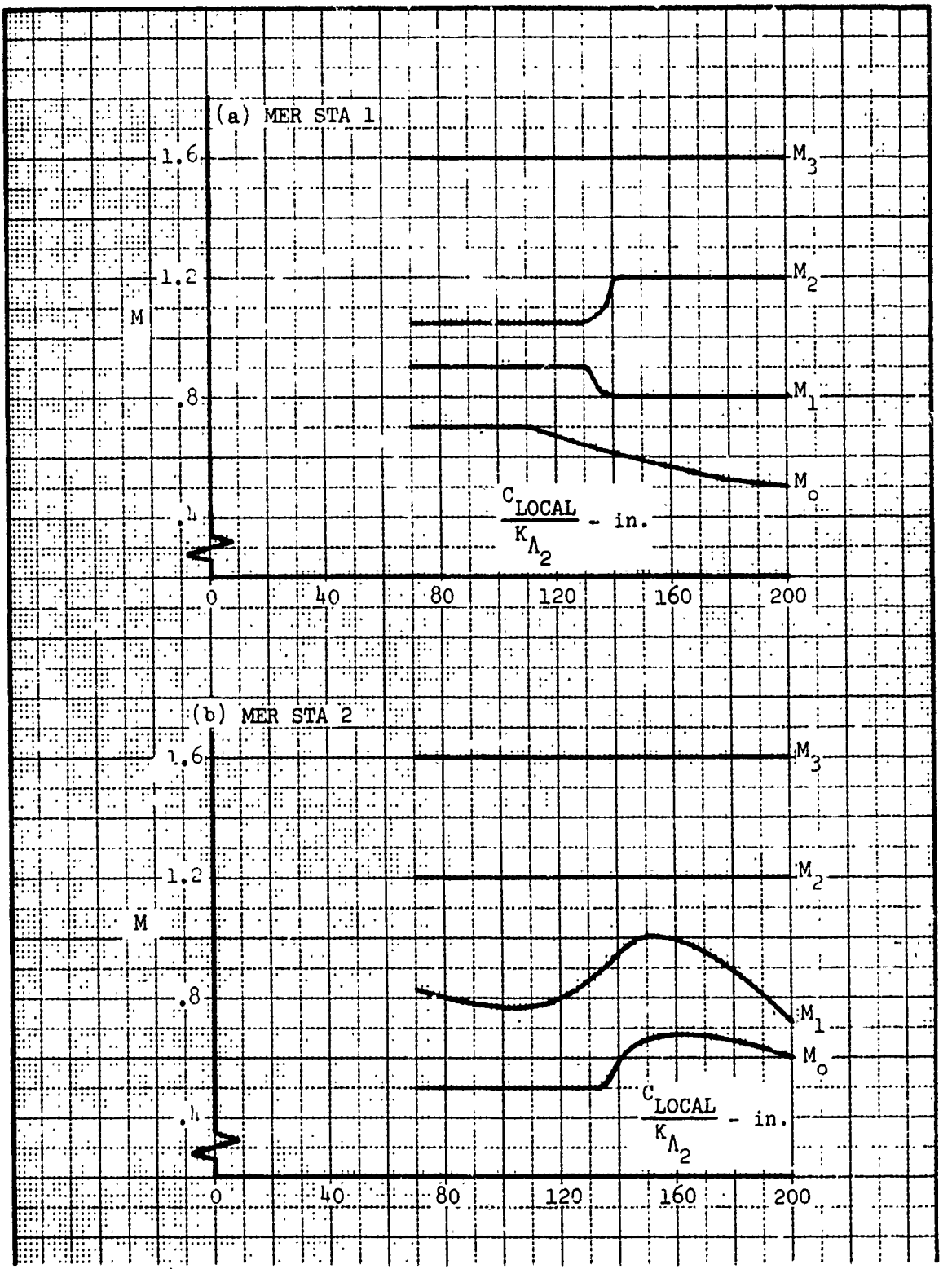


Figure 545. Normal Force Slope - Mach Number Break Points for MER Stations 1 and 2

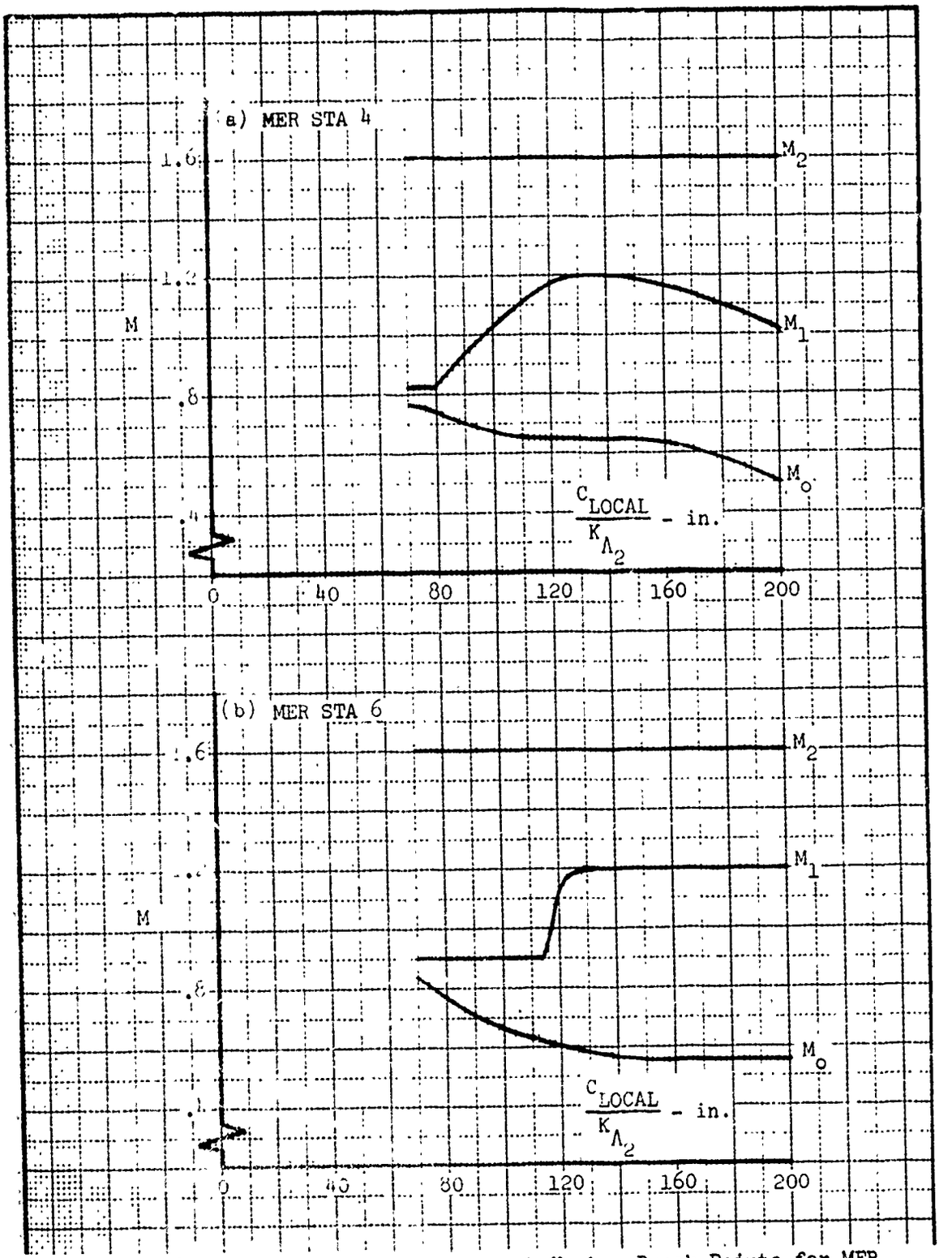


Figure 546. Normal Force Slope - Mach Number Break Points for MER Stations 4 and 6

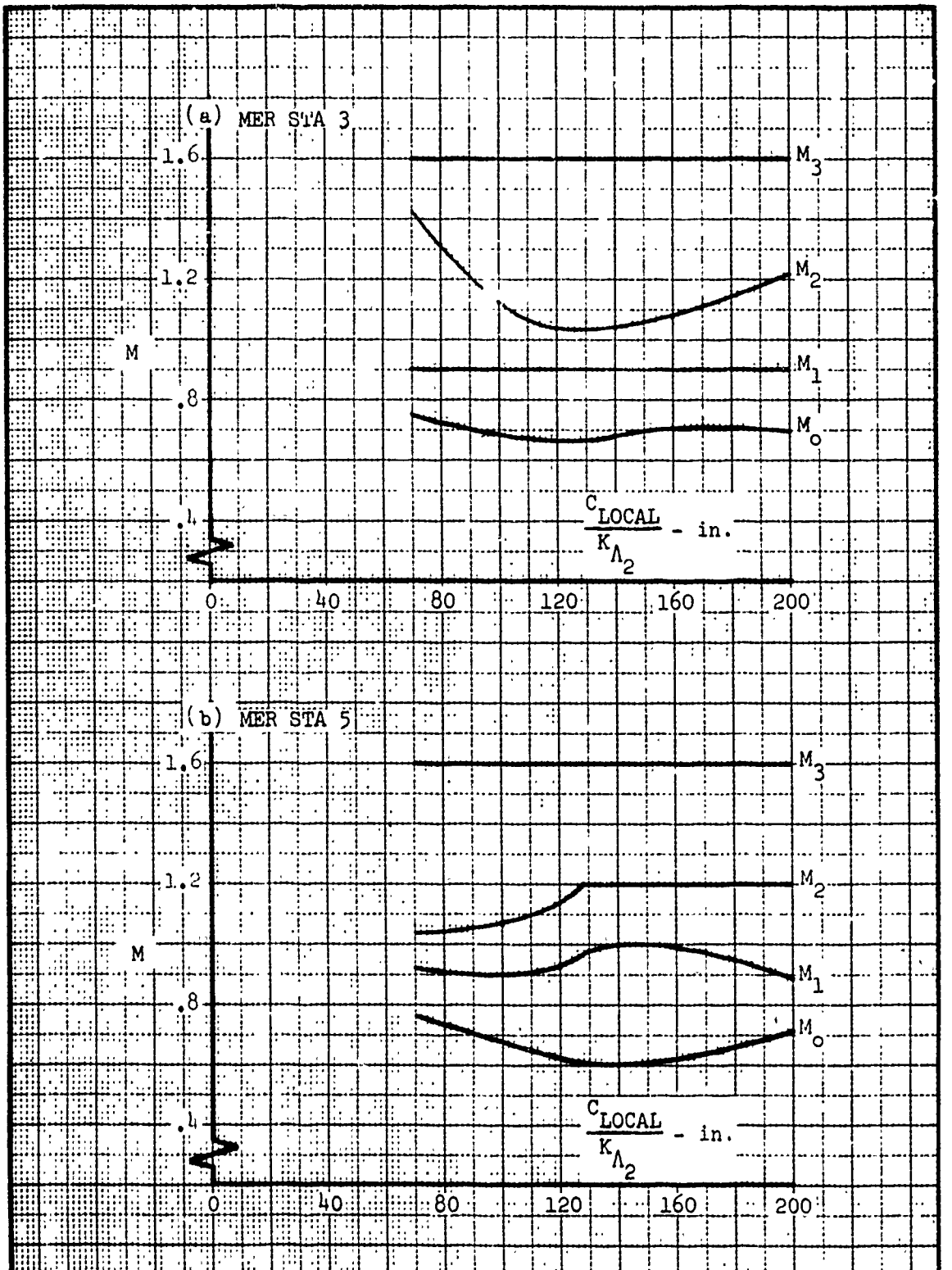


Figure 547 Normal Force Slope - Mach Number Break Points for MER Stations 3 and 5

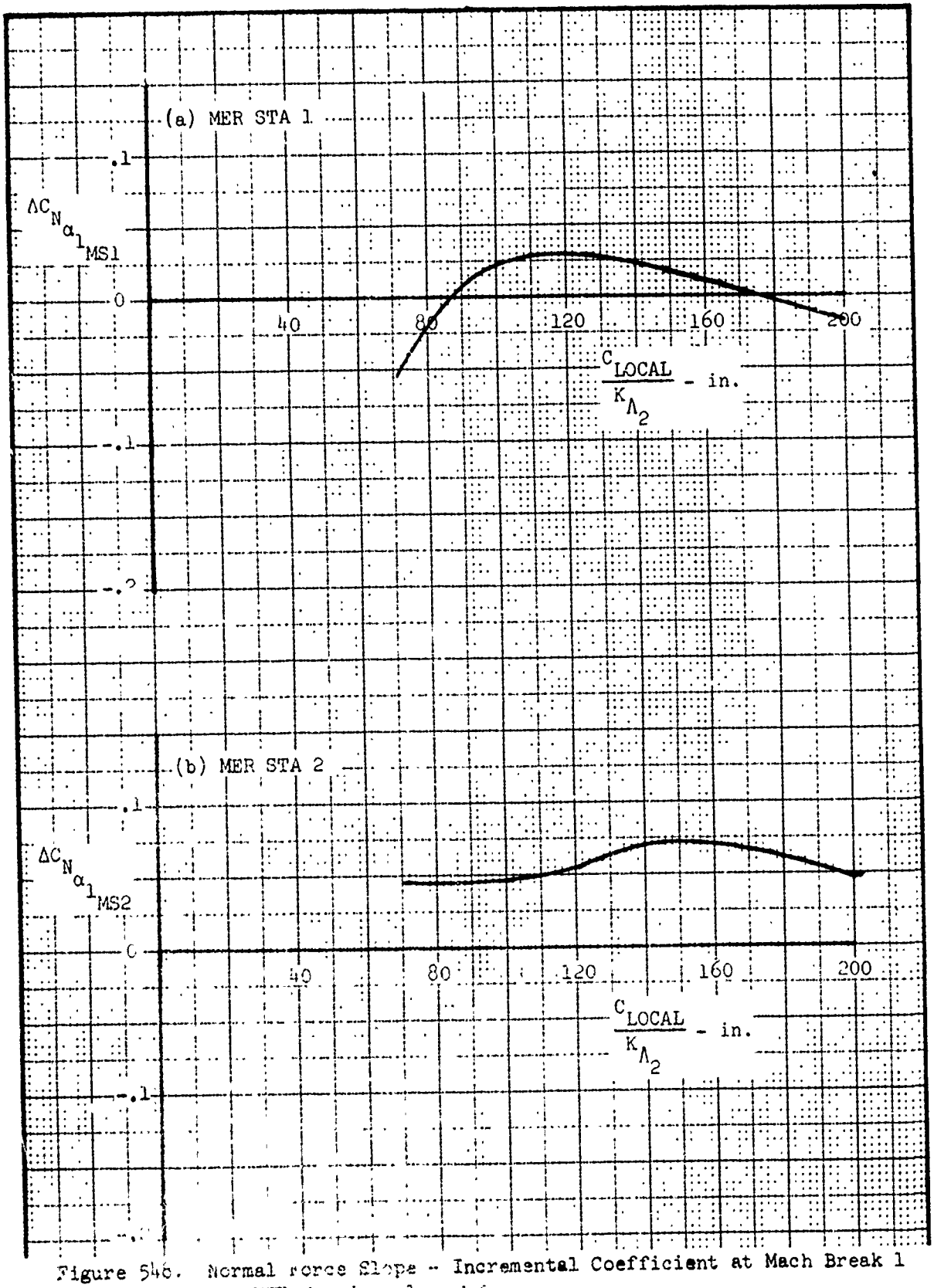


Figure 546. Normal Force Slope - Incremental Coefficient at Mach Break 1 for MER Stations 1 and 2

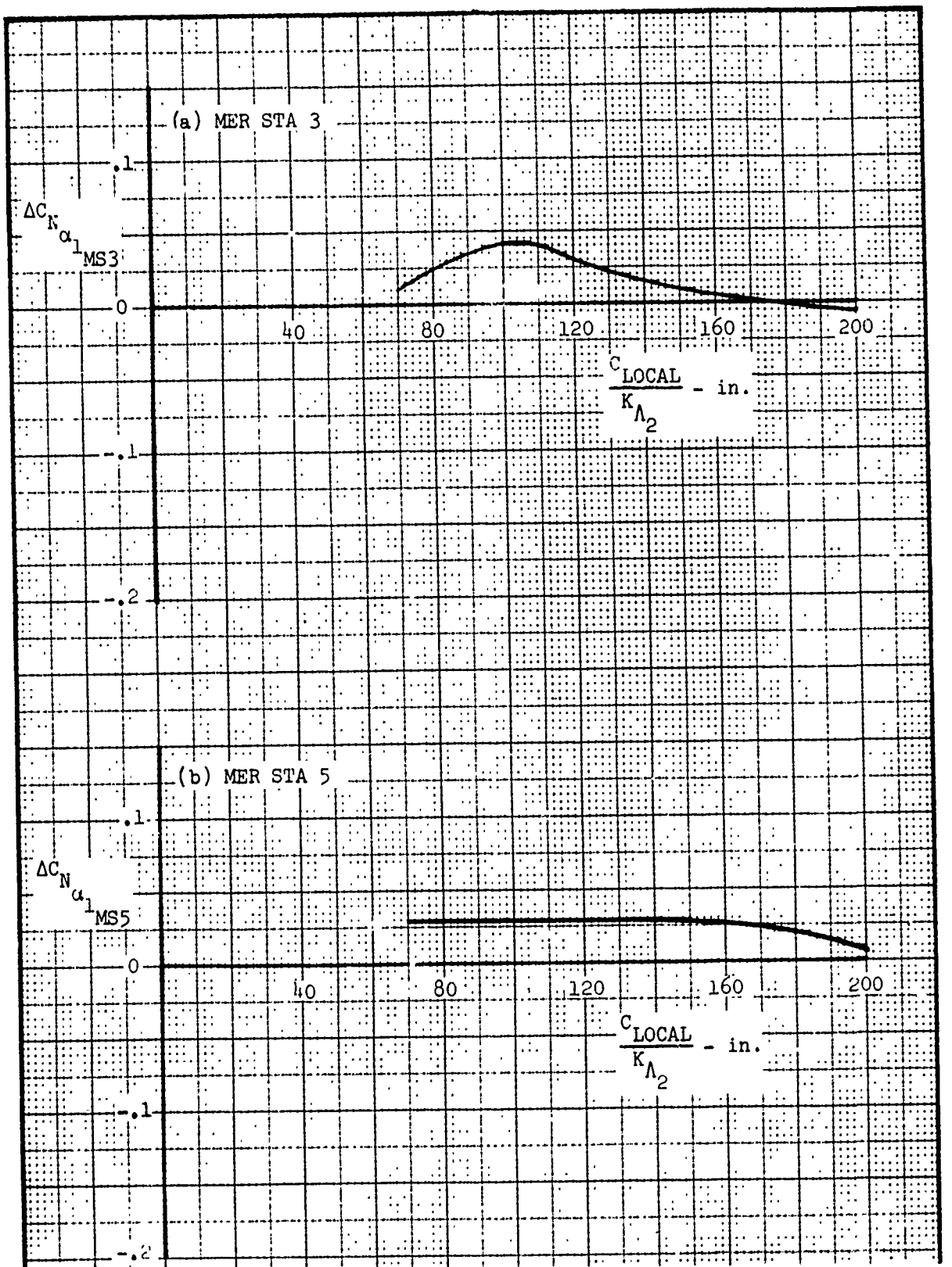


Figure 549. Normal Force Slope - Incremental Coefficient at Mach Bresk 1 for MER Stations 3 and 5

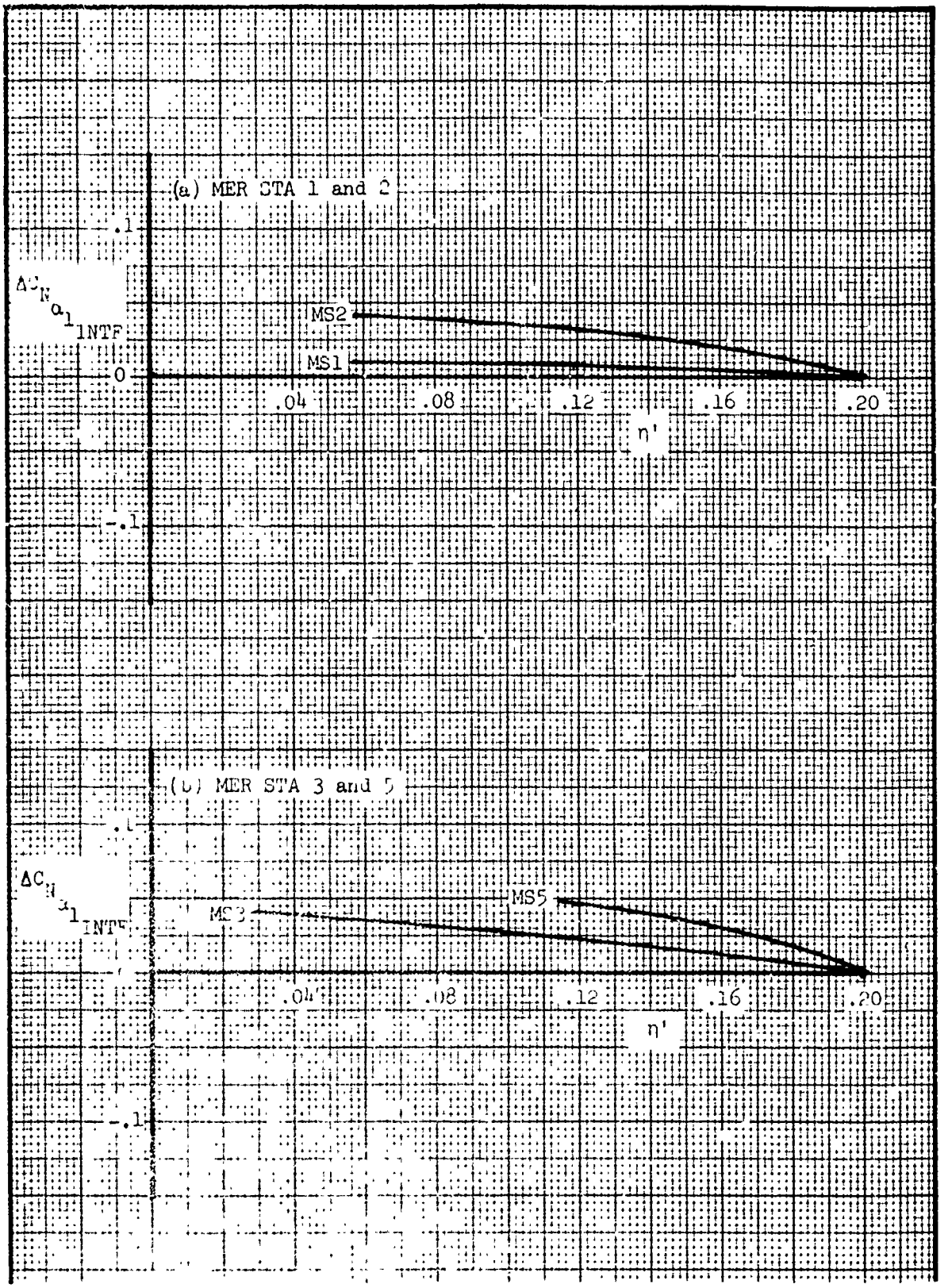


Figure [illegible] - Fuselage Interference Correction at Mach [illegible] Configurations 1,2,3 and 5

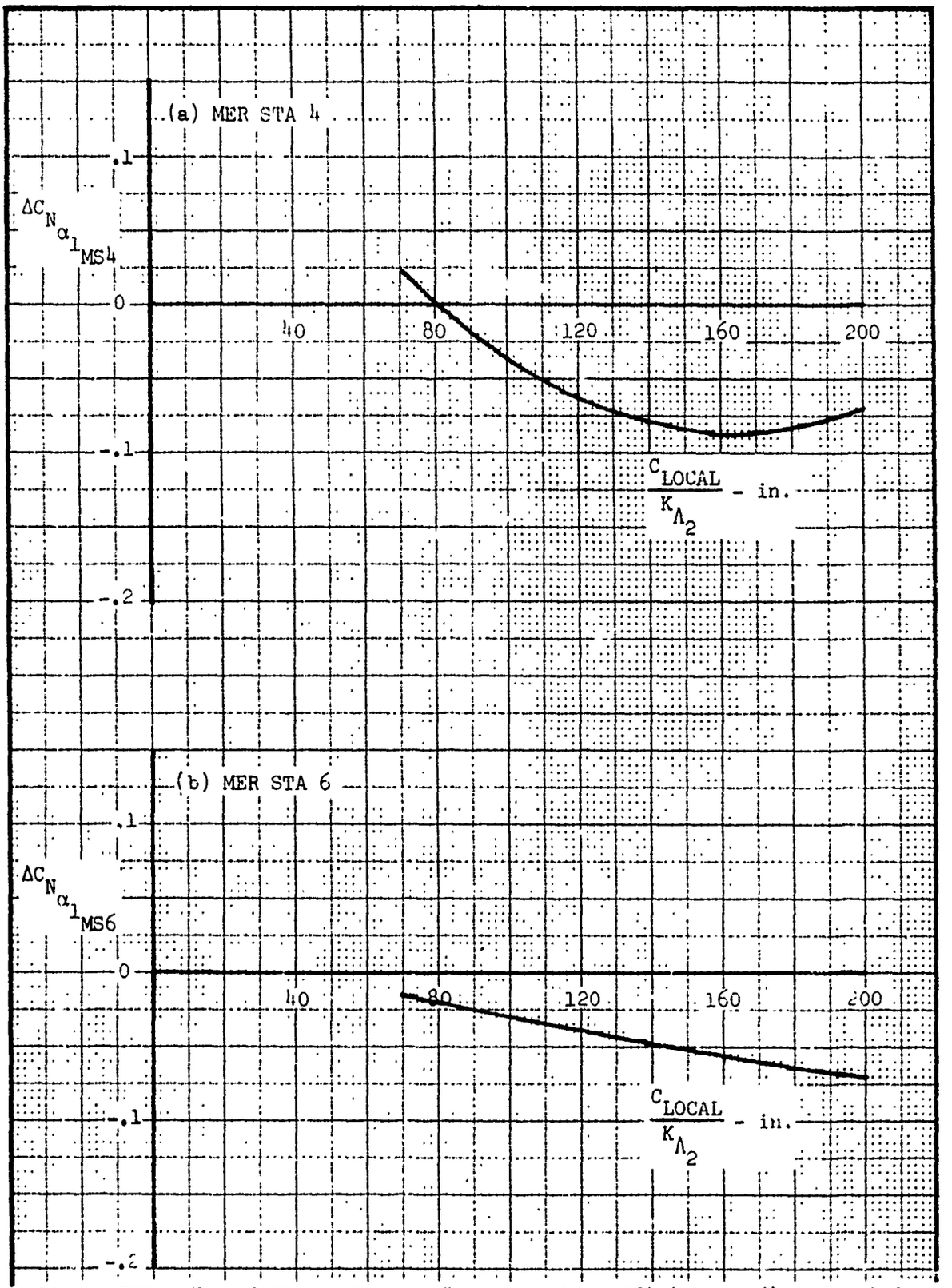


Figure 551. Normal Force Slope - Incremental Coefficient at Mach Break 1 for MER Stations 4 and 6

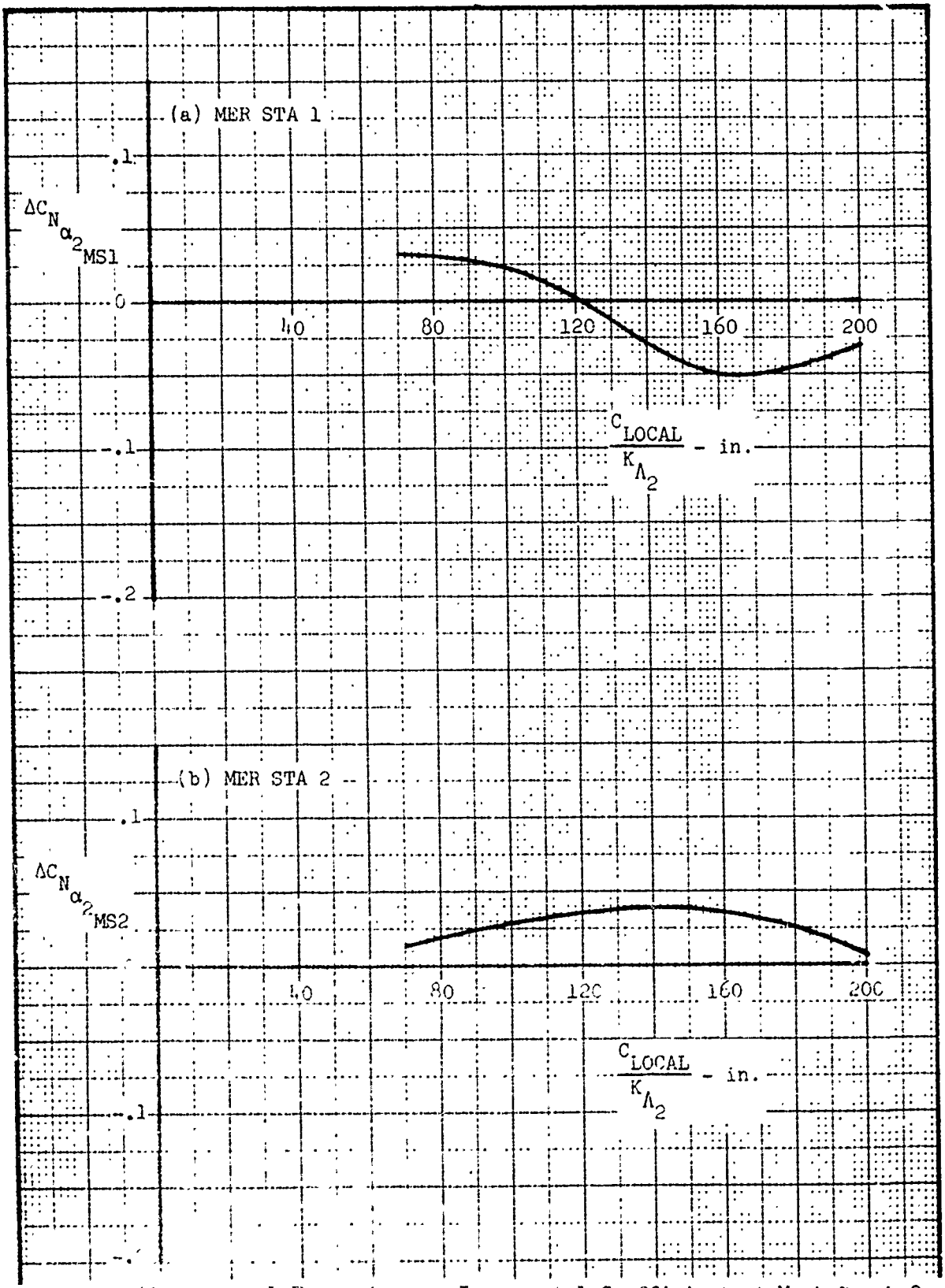


Figure 59. Normal Force Slope - Incremental Coefficient at Mach Break 2 for MER Stations 1 and 2

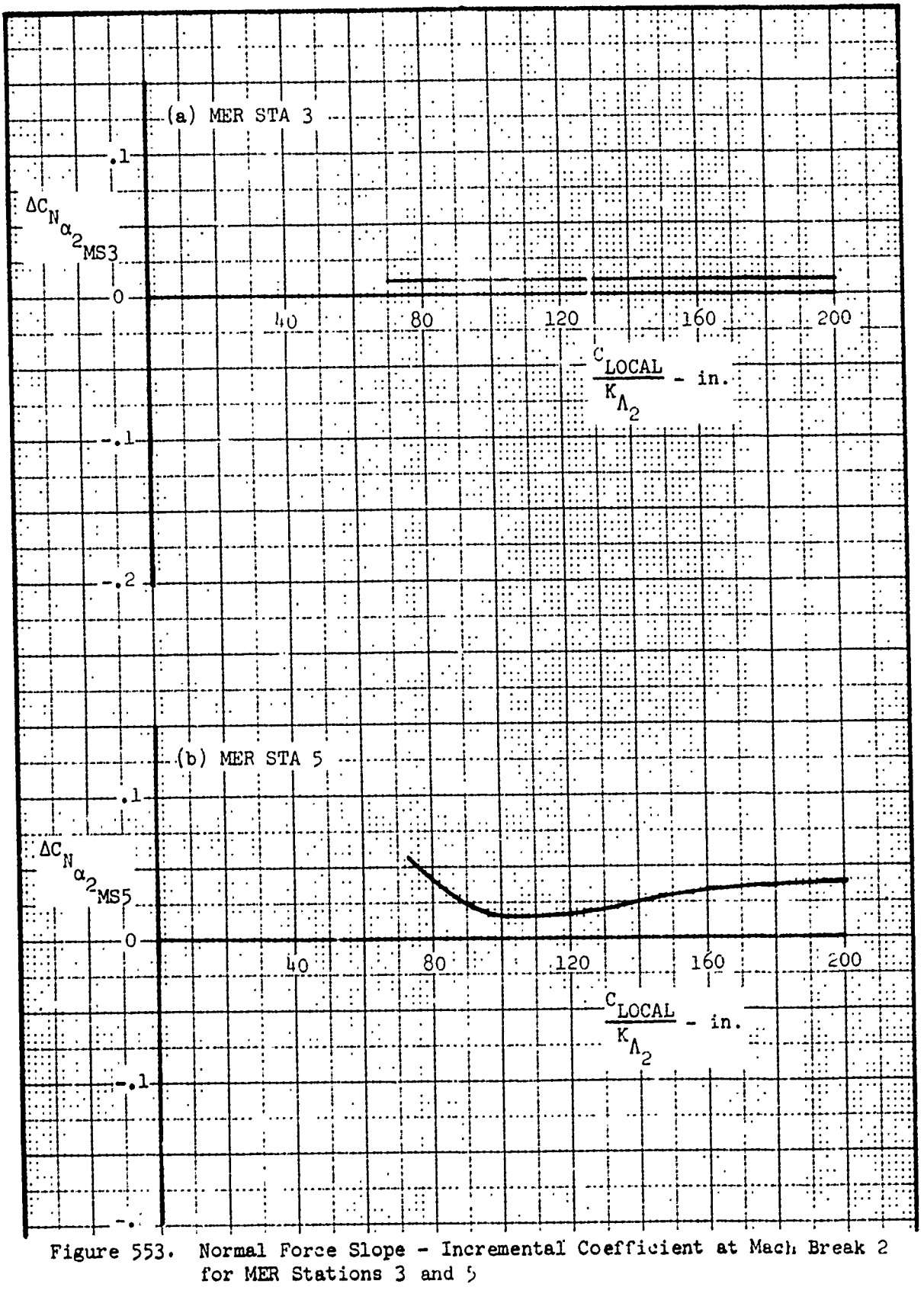


Figure 553. Normal Force Slope - Incremental Coefficient at Mach Break 2 for MER Stations 3 and 5

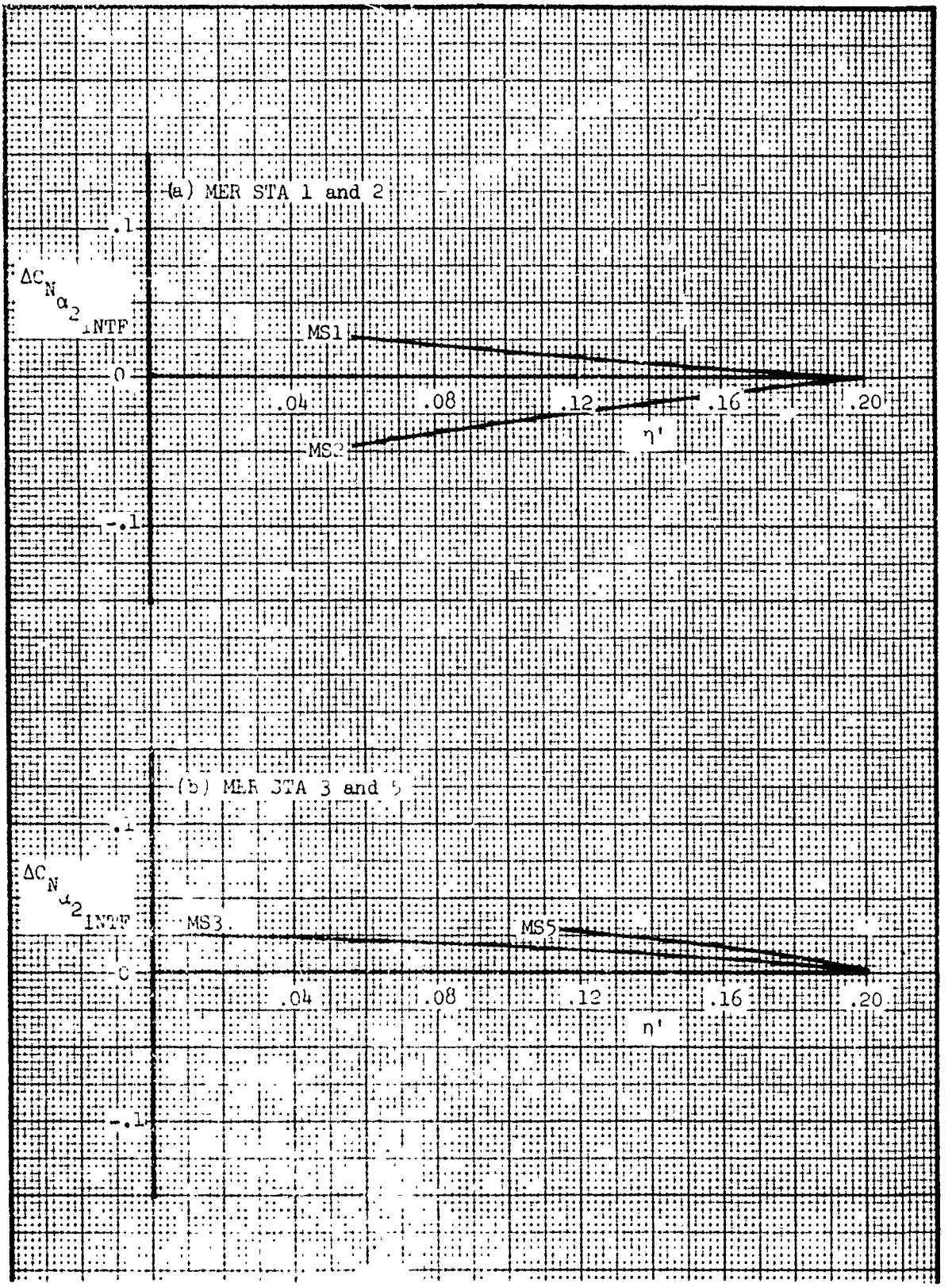


Figure 55a. Normal Force Slope - Fuselage Interference Correction at Mach Break - for MER Stations 1,2,3, and 5

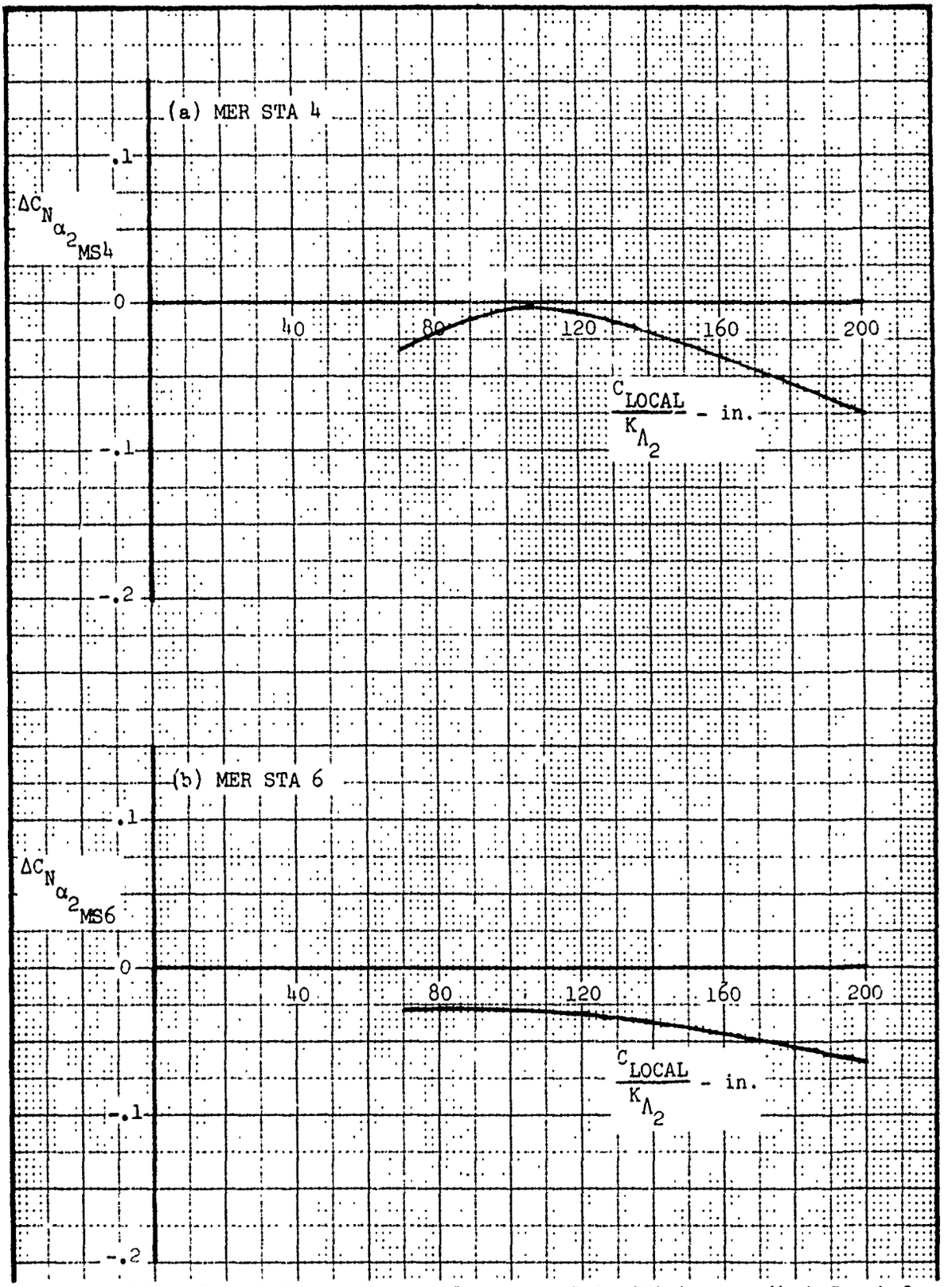


Figure 555. Normal Force Slope - Incremental Coefficient at Mach Break 2 for MER Stations 4 and 6

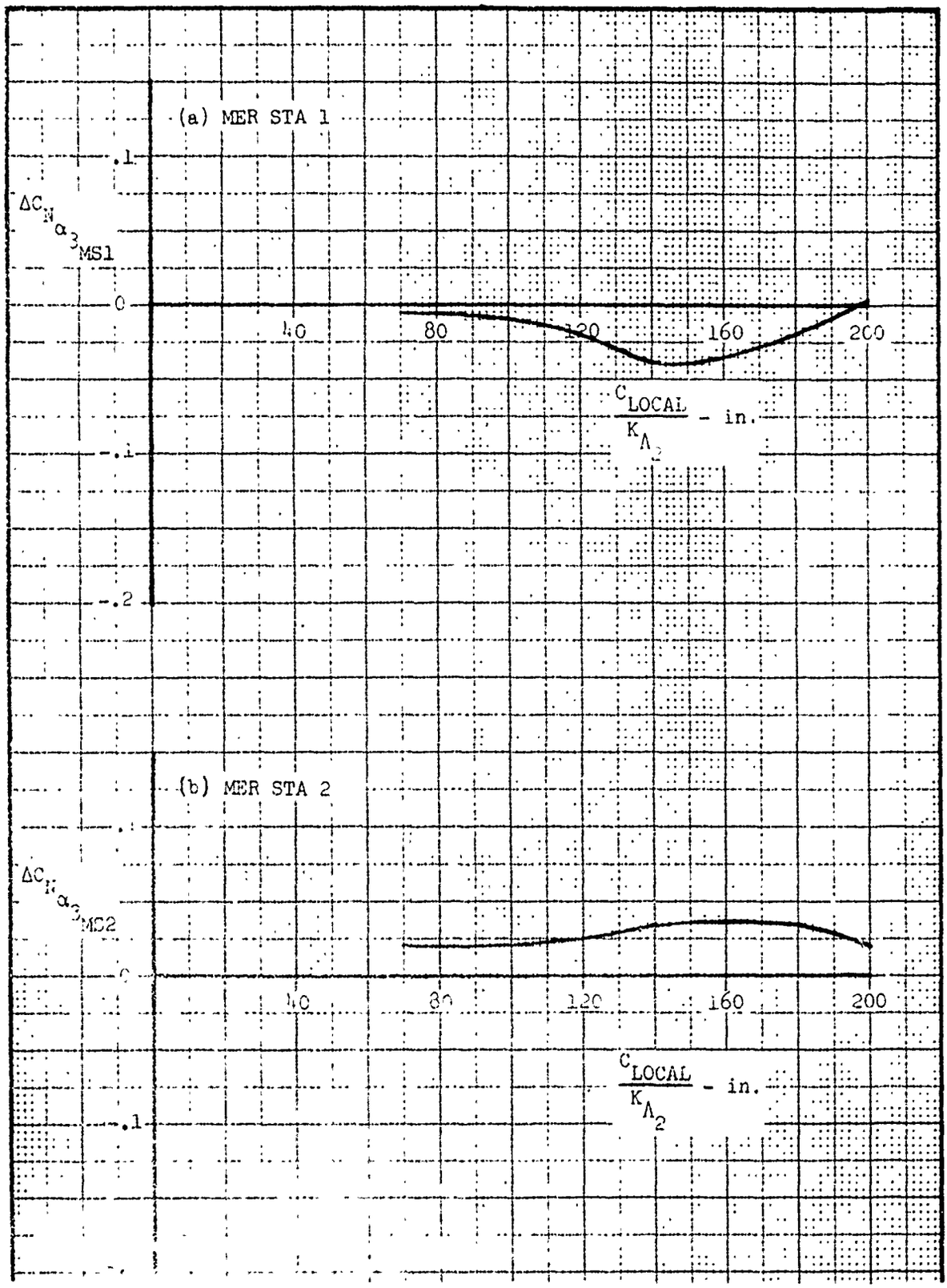


Figure 156. Normal Force Slope - Incremental Coefficient at Mach Break 3 for MER Stations 1 and 2

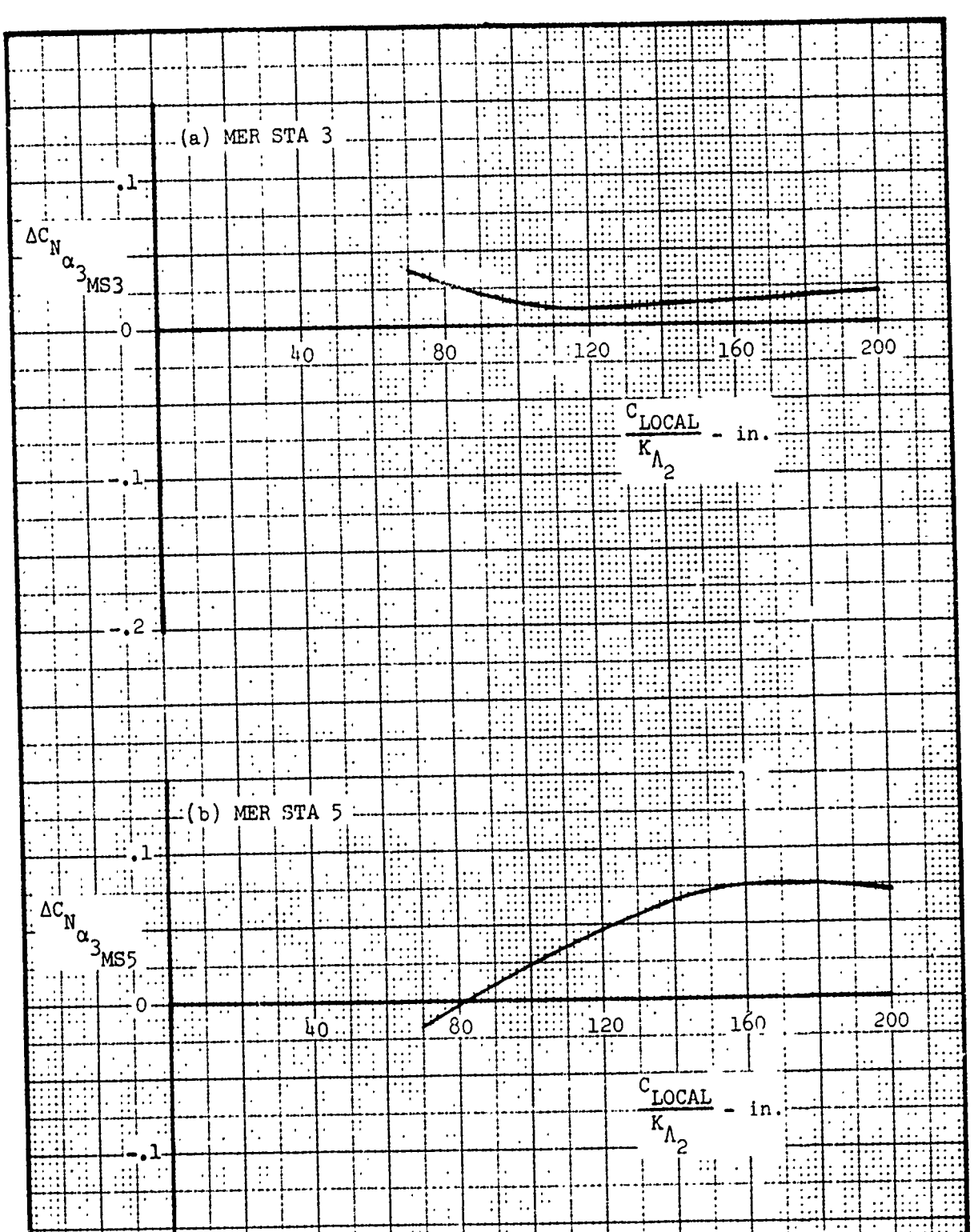


Figure 557. Normal Force Slope - Incremental Coefficient at Mach Break 3 for MER Stations 3 and 5

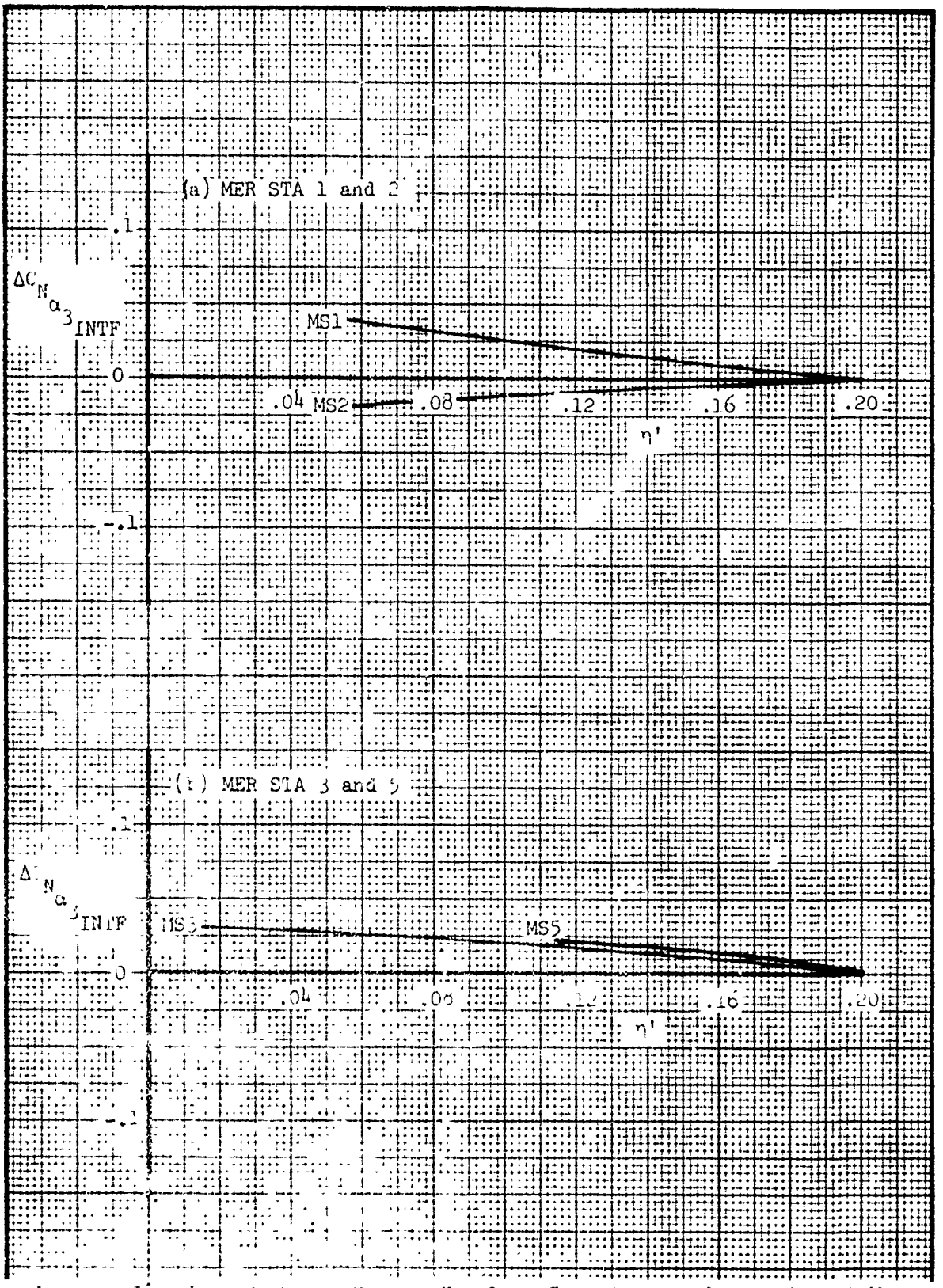


Figure 5. Normal Force Slope - Fuselage Interference Correction at Mach Break 3 for MER Stations 1,2,3 and 5

4.3.1.3 Intercept Prediction

The prediction of captive store normal force intercept, $\left(\frac{NF}{q}\right)_{\alpha=0}$, is divided into two sections, fuselage centerline-mounted stores and wing pylon-mounted stores. The technique presented in this section predicts the normal force intercept, $\left(\frac{NF}{q}\right)_{\alpha=0}$, for M = 0.5.

FUSELAGE CENTERLINE-MOUNTED STORES

MER STATIONS 1 and 2(MS1,2):

$$\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ PRED_{\mathfrak{L}} \\ MS1,2}} = 0$$

MER STATIONS 3, 4, 5, and 6 (MS3-6):

$$\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ PRED_{\mathfrak{L}} \\ MS3-6}} = C_{N_{\substack{\alpha=0_{\mathfrak{L}} \\ MS3-6}}} \quad S_{REF} = f(d)$$

where:

$C_{N_{\substack{\alpha=0_{\mathfrak{L}}}}}$ - Variation of $C_{N_{\alpha=0}}$ as a function of store diameter.

MER STA 3 - Figure 559

MER STA 4 - Figure 559

MER STA 5 - Figure 559

MER STA 6 - Figure 559

S_{REF} - Store reference area, $\frac{\pi d^2}{4}$, ft^2.

WING-MOUNTED STORES

$$\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ PRED \\ MS1-6}} = \left(\Delta C_{N_{\substack{\alpha=0 \\ MS1-6}}} + \Delta C_{N_{\substack{\alpha=0 \\ \frac{\ell_{LE_F}}{C} \\ MS1-6}}} + \Delta C_{N_{\substack{\alpha=0 \\ INTF \\ MS1-6}}}\right) K_{SCALE_{NF}} K_{\Lambda_2}$$

where

$\Delta C_{N_{\alpha=0}}$ - Variation of $C_{N_{\alpha=0}}$ as a function of C_{LOCAL}/K_{Λ_2}

MER STA 1 - Figure 560
MER STA 2 - Figure 560
MER STA 3 - Figure 566
MER STA 4 - Figure 563
MER STA 5 - Figure 566
MER STA 6 - Figure 563

$\Delta C_{N_{\substack{\alpha=0 \\ \frac{\ell_{LE_F}}{C}}}}$ - Incremental $C_{N_{\alpha=0}}$ based on the distance from the wing leading edge to the nose of the store on MER STATION 2 measured in the wing plan view divided by the local chord, positive.

MER STA 1 - Figure 561
MER STA 2 - Figure 561
MER STA 3 - Figure 567
MER STA 4 - Figure 564
MER STA 5 - Figure 567
MER STA 6 - Figure 564

$\Delta C_{N_{\substack{\alpha=0 \\ INTF}}}$ - Incremental $C_{N_{\alpha=0}}$ due to the interference effect of the fuselage for high wing aircraft.

MER STA 1 - Figure 562
MER STA 2 - Figure 562
MER STA 3 - Figure 568
MER STA 4 - Figure 565

MER STA 5 - Figure 568

MER STA 6 - Figure 565

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Wing sweep correction factor, $\frac{\cos \Lambda}{\cos 45^\circ}$, where Λ is the quarter chord sweep angle of the aircraft wing.

A numerical example illustrating the calculation procedure is presented in Subsection 4.1.1.3.

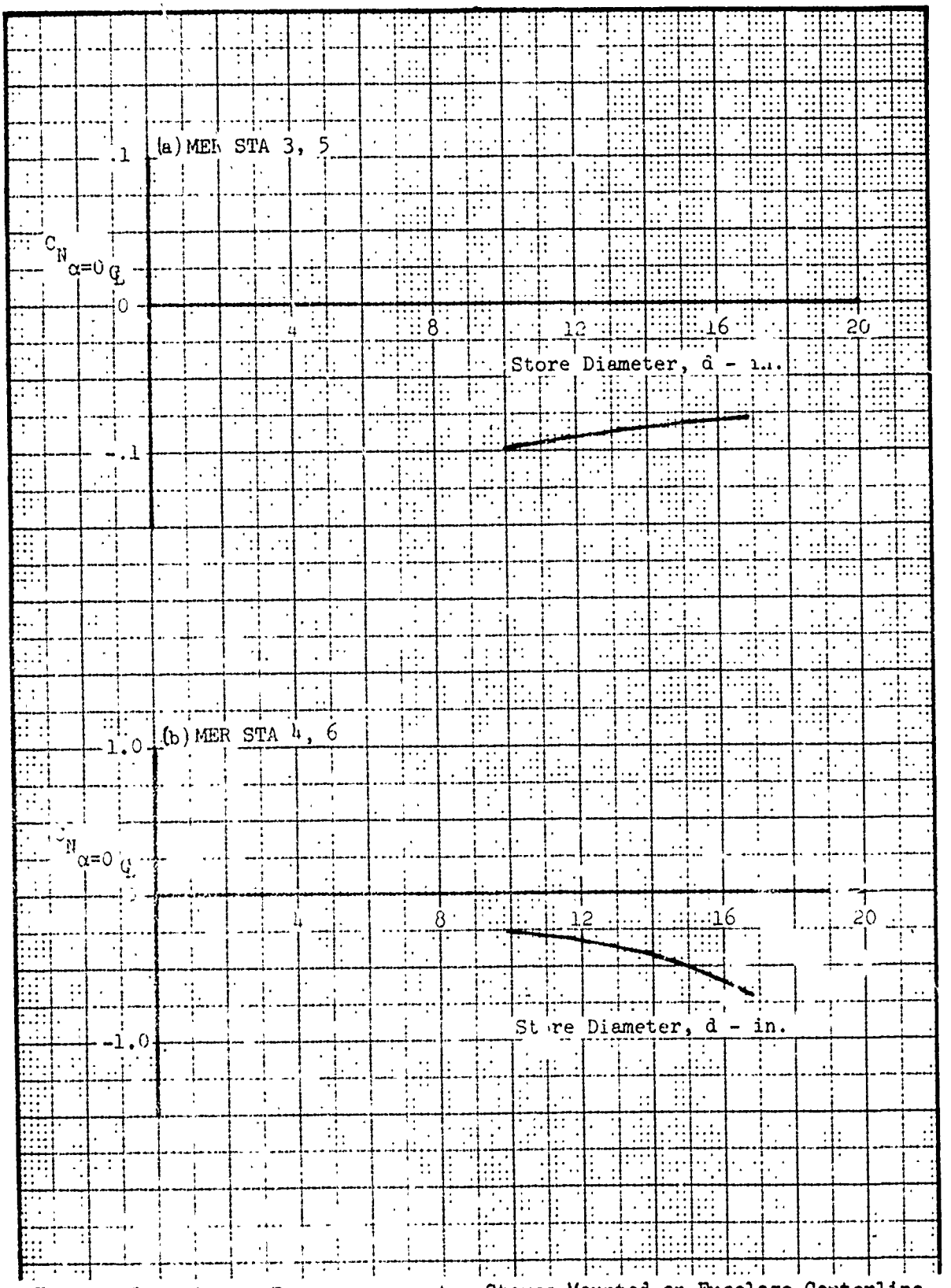


Figure [illegible]. Normal Force Intercept -- Stores Mounted on Fuselage Centerline, MER Stations 3-6

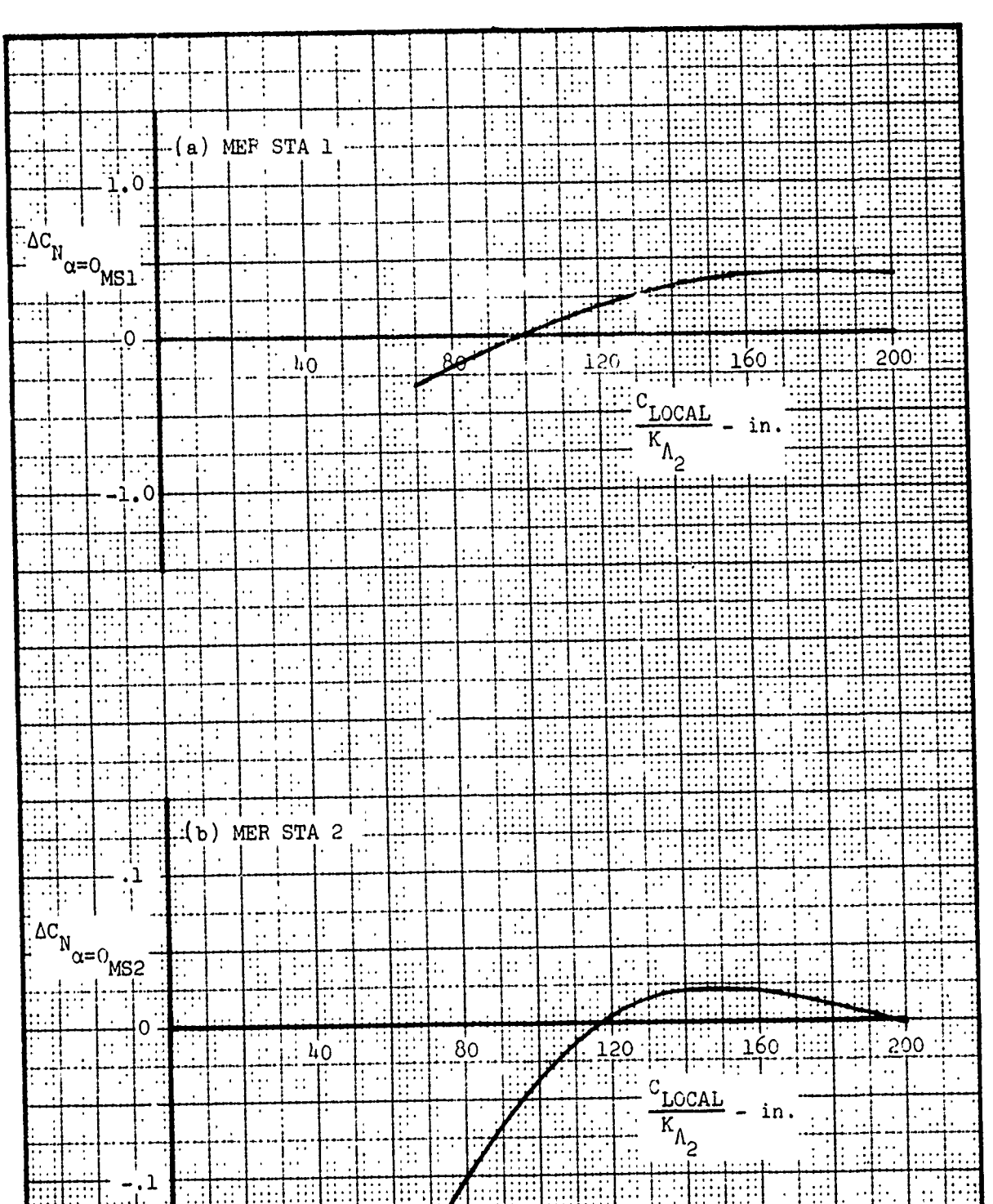


Figure 560. Normal Force Intercept - Incremental Coefficient for MER Stations 1 and 2

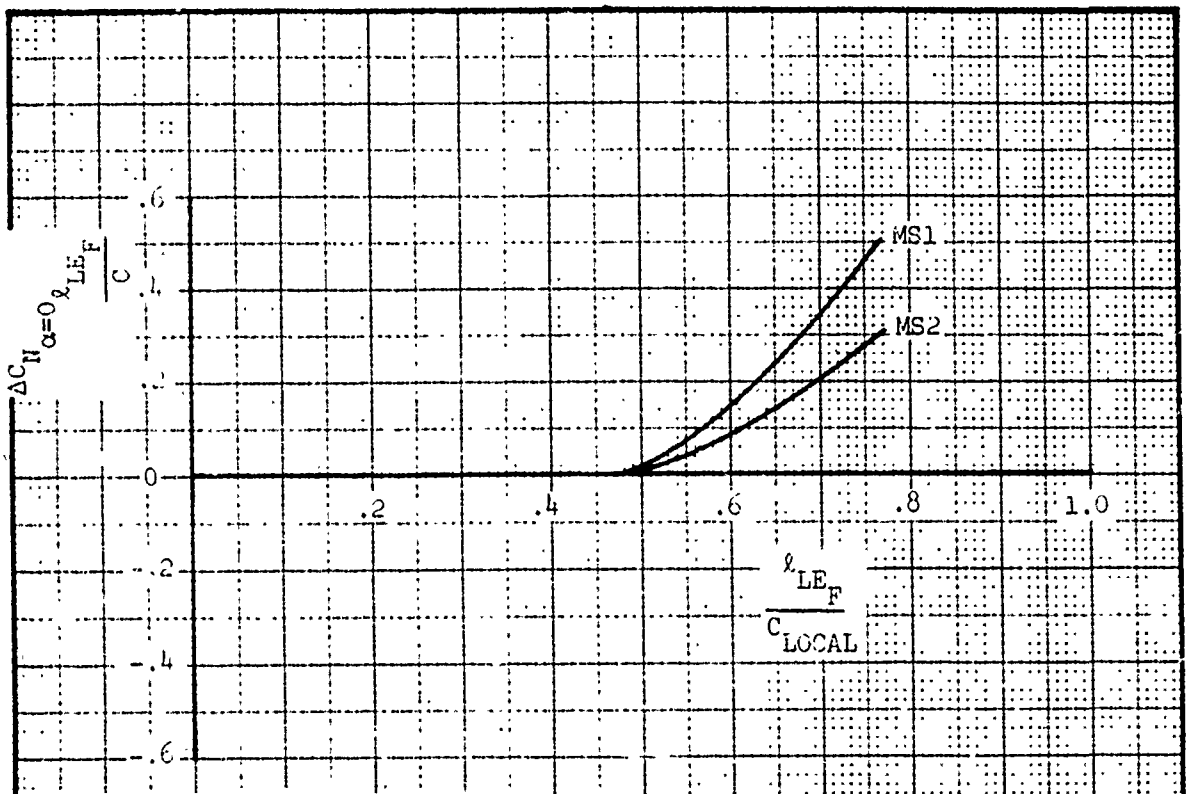


Figure 561. Normal Force Intercept - Chordwise Position Correction for MER Stations 1 and 2

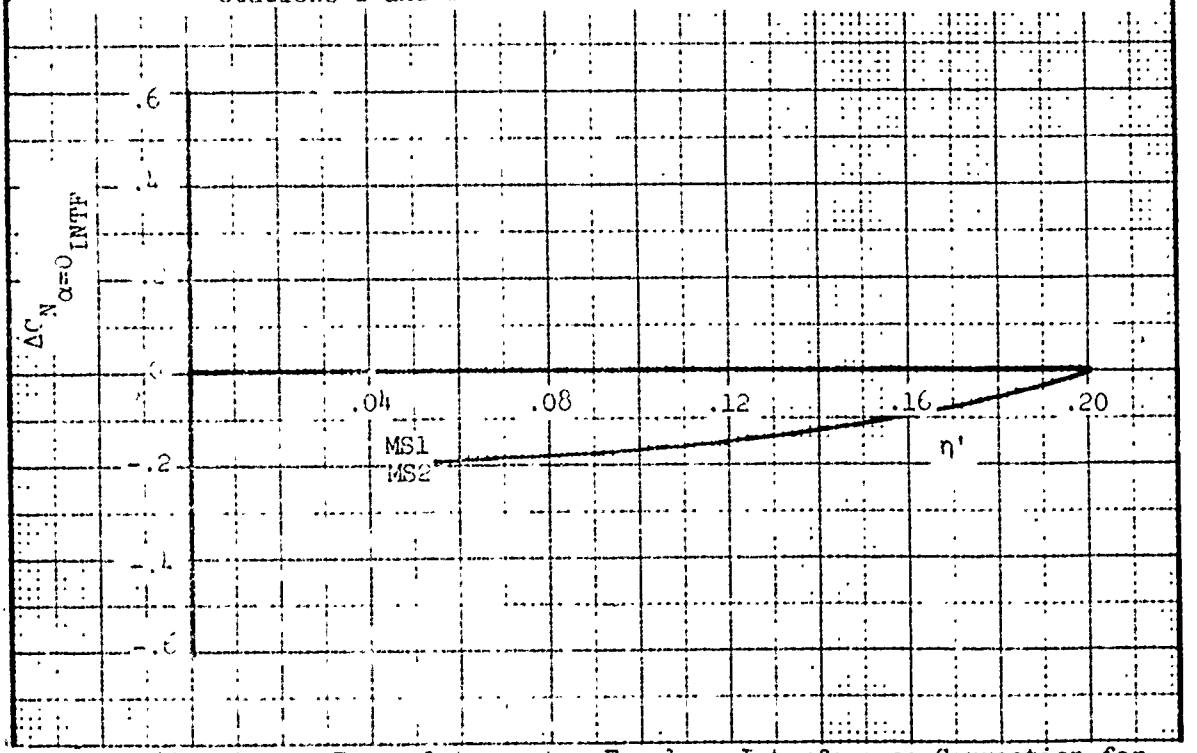


Figure 562. Normal Force Intercept - Fuselage Interference Correction for MER Stations 1 and 2

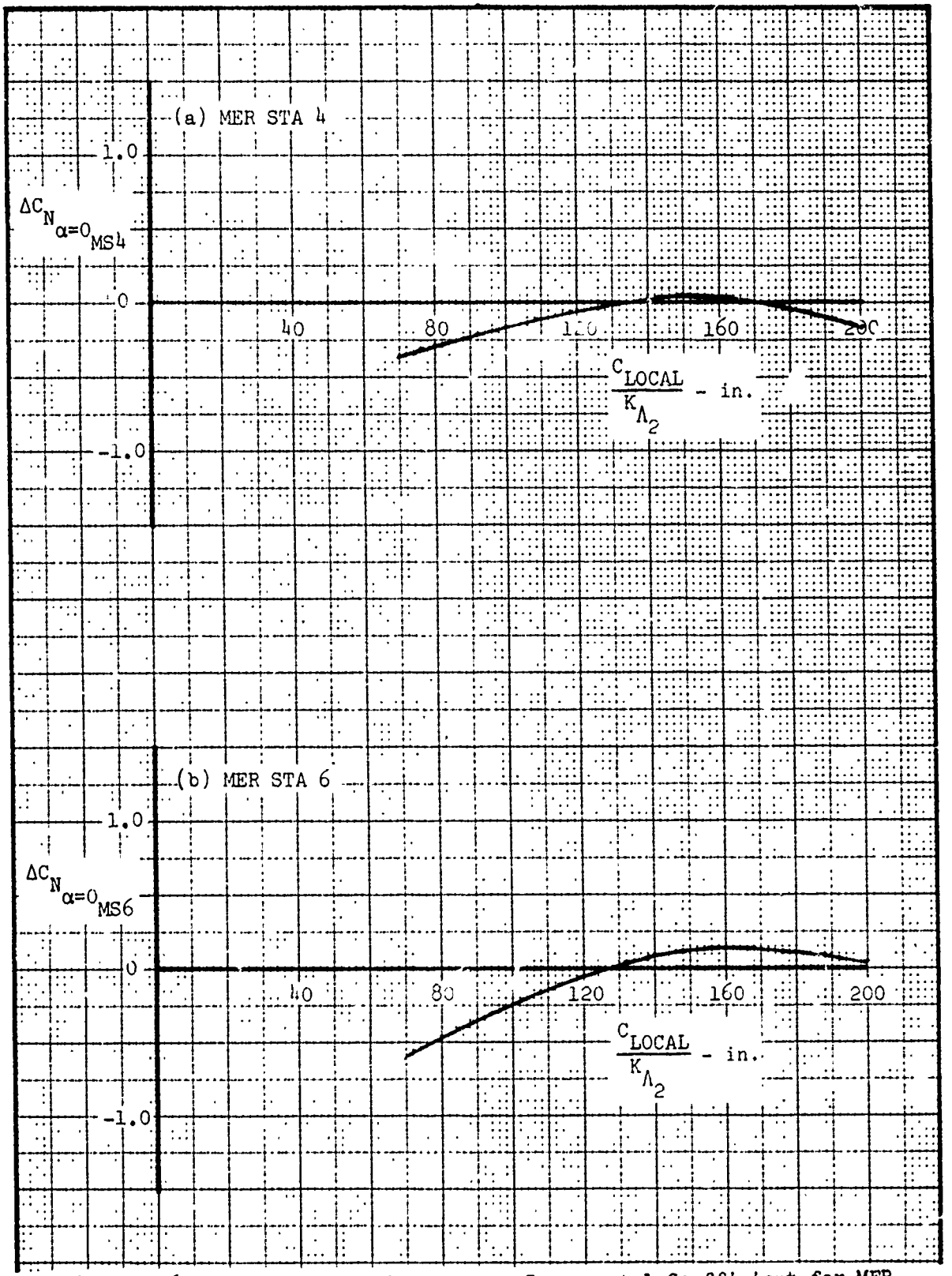


Figure 563. Normal Force Intercept - Incremental Coefficient for MER Stations 4 and 6

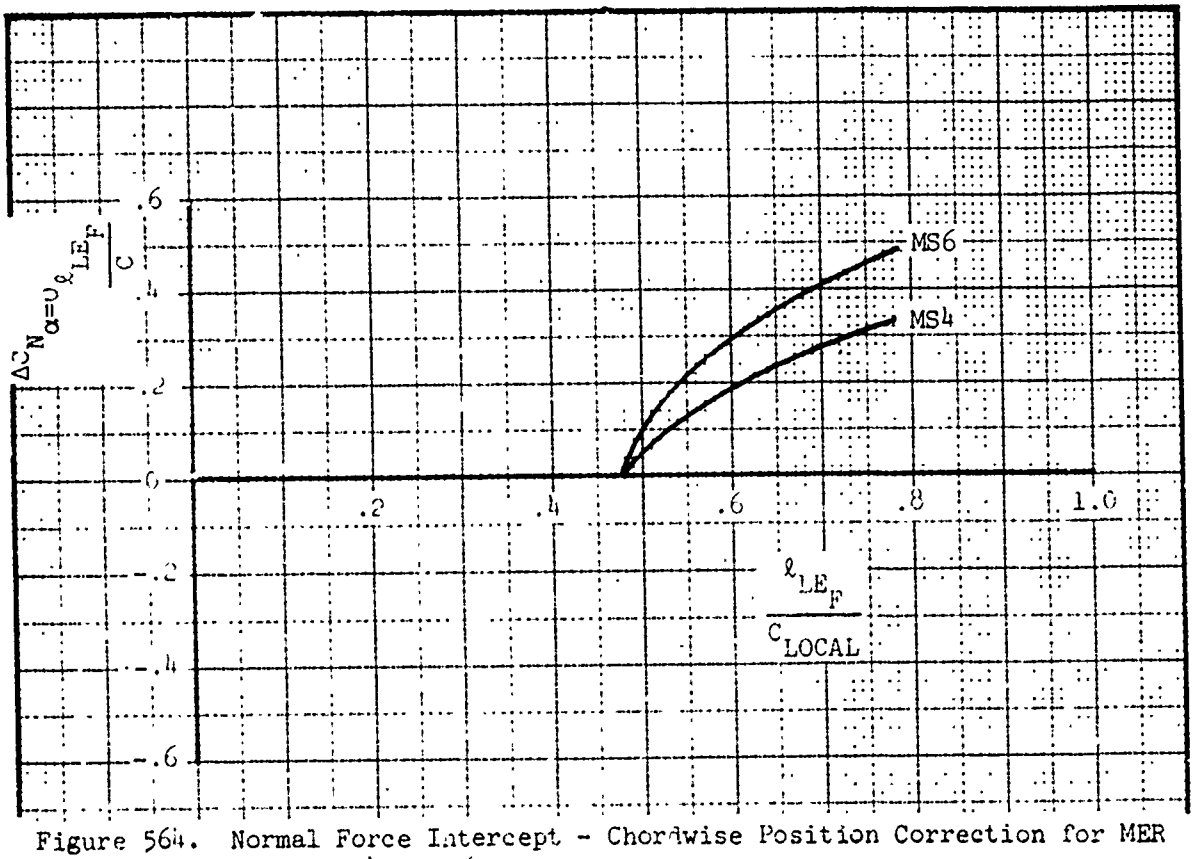


Figure 564. Normal Force Intercept - Chordwise Position Correction for MER Stations 4 and 6

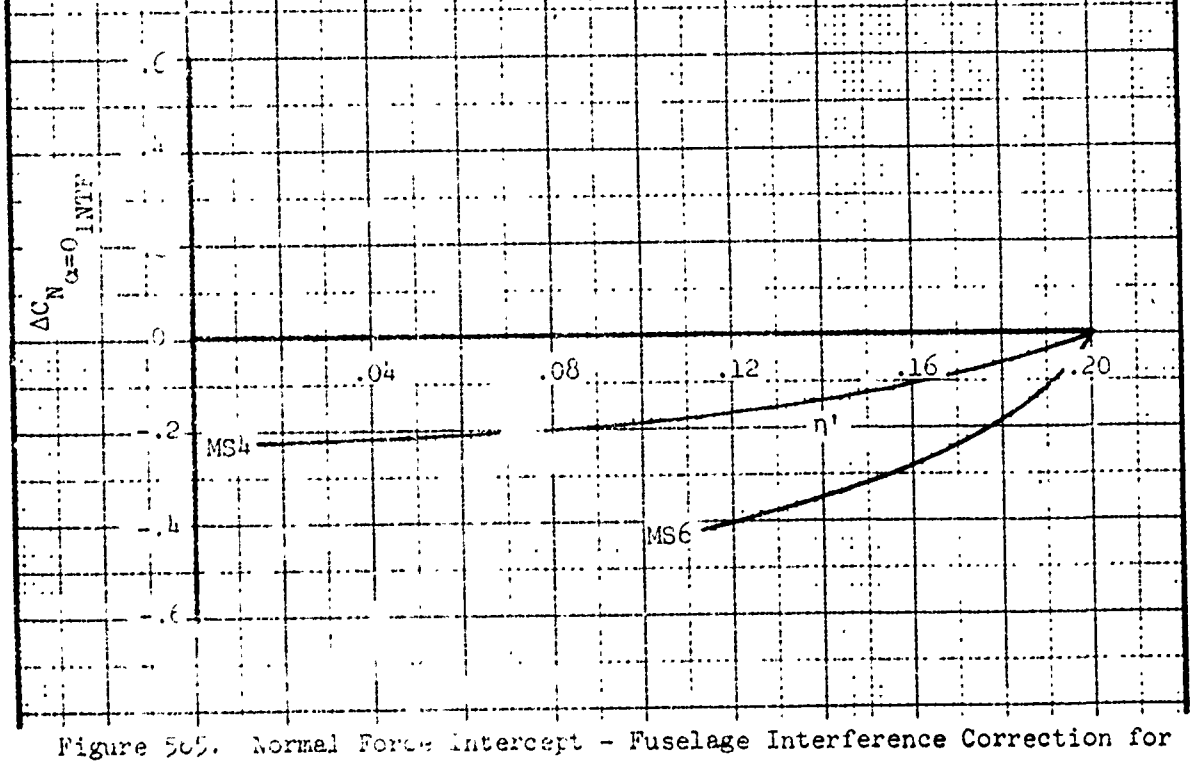


Figure 565. Normal Force Intercept - Fuselage Interference Correction for MER Stations 4 and 6

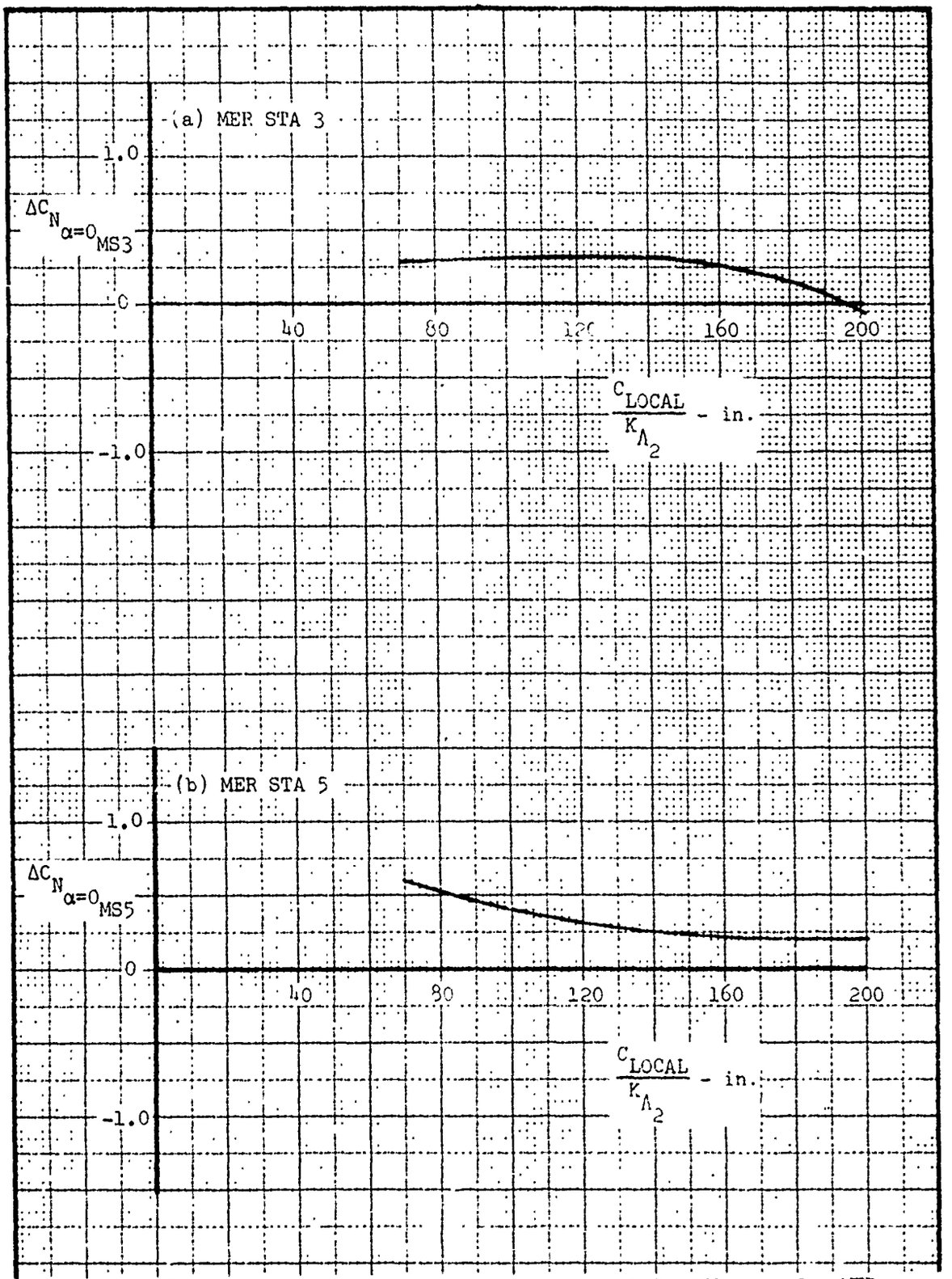


Figure 566. Normal Force Intercept - Incremental Coefficient for MER Stations 3 and 5

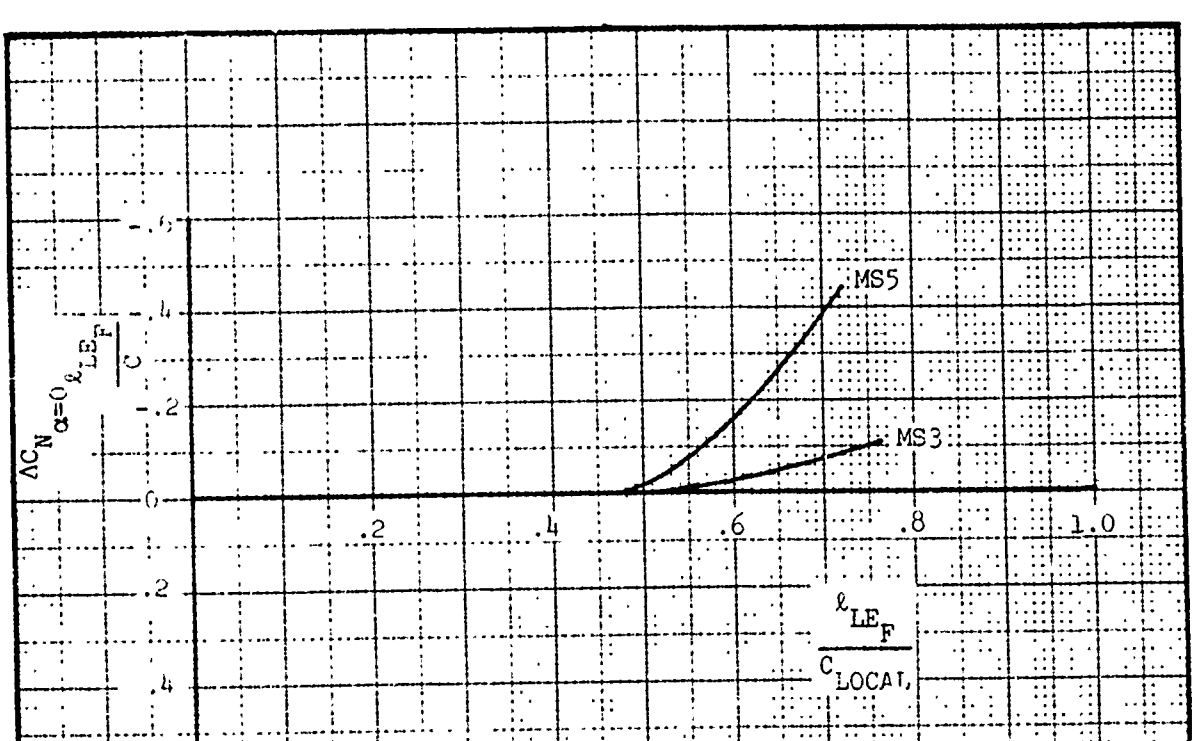


Figure 56. Normal Force Intercept - Chordwise Position Correction for MER Stations 3 and 5

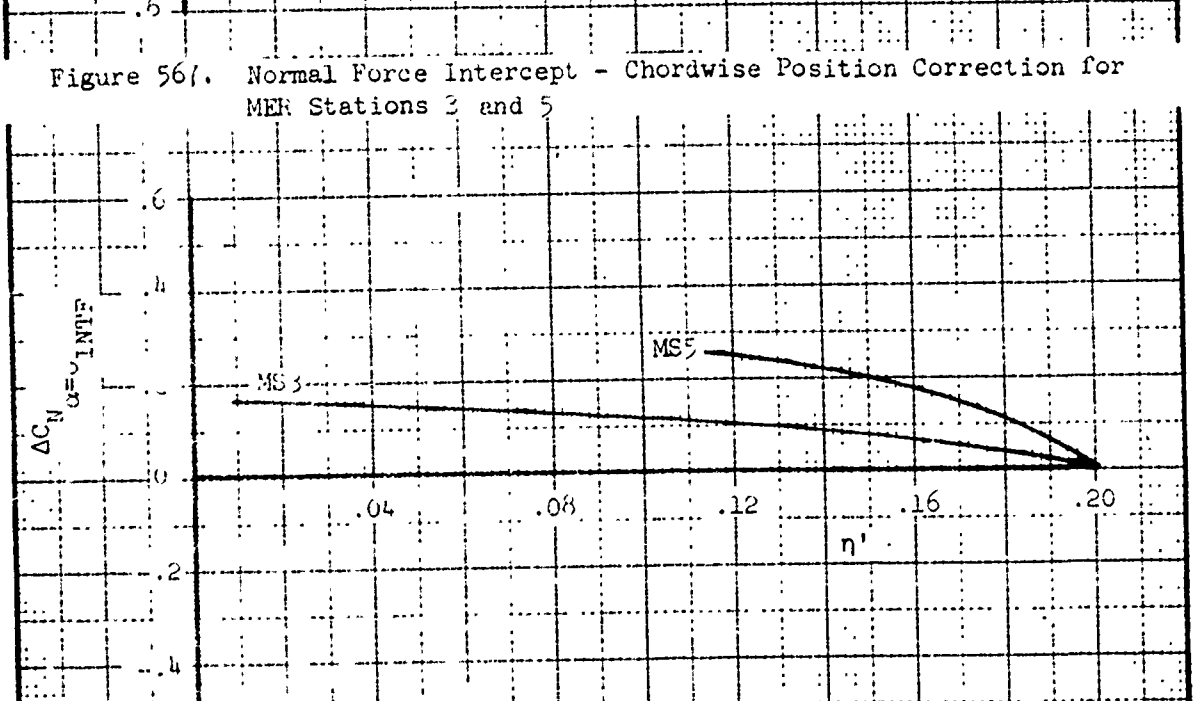


Figure 57. Normal Force Intercept - Spanwise Correction for MER Stations 3 and 5

4.3.1.4 Intercept Mach Number Correction

To compute the variation in normal force intercept, $\left(\frac{NF}{a}\right)_{\alpha=0}$, between M = 0.5 and 1.6, use the following relationship.

$$\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ M=x}} = \left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ PRED}} + \Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ M=x}}$$

where:

$\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ PRED}}$ - Normal force intercept predicted at M = 0.5.

$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ M=x}}$ - Increment in normal force intercept at M = x.

FUSELAGE CENTERLINE-MOUNTED STORES

MER STATIONS 1-6 (MS1-6):

$$\left(\frac{NF}{q}\right)_{\substack{\alpha=0_{\mathfrak{L}} \\ M=x \\ MS1-6}} = \left(\frac{NF}{q}\right)_{\substack{\alpha=0_{\mathfrak{L}} \\ PRED \\ MS1-6}} + \Delta C_{N_{\substack{\alpha=0_{\mathfrak{L}} \\ MS1-6}}} K_{SCALE_{NF}}$$

where:

$\left(\frac{NF}{q}\right)_{\substack{\alpha=0_{\mathfrak{L}} \\ PRED}}$ - Value predicted at M =0.5 from Subsection 4.3.1.3, ft^2.

$\Delta C_{N_{\alpha=0_{\mathfrak{L}}}}$ - Incremental $C_{N_{\alpha=0}}$ presented as a function of Mach number.

MER STA 1 - Figure 570
MER STA 2 - Figure 570
MER STA 3 - Figure 570
MER STA 4 - Figure 570
MER STA 5 - Figure 570
MER STA 6 - Figure 570

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

WING-MOUNTED STORES

A generalized curve depicting the normal force intercept variation with Mach number is shown in Figure 569.

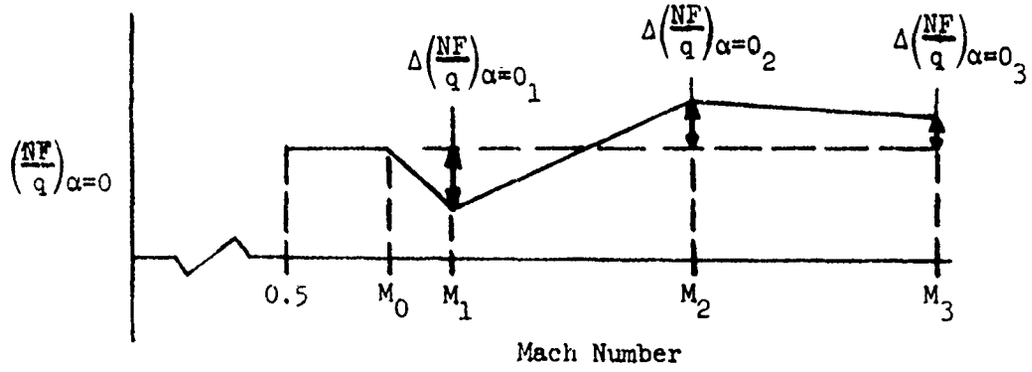


Figure 569. Normal Force Intercept - Generalized Mach Number Variation

The intercept variation with Mach number has been approximated by a series of linear segments with break points occurring at Mach numbers defined by M_0, M_1, M_2, and M_3. The variation of the Mach break points is presented in Figures 571, 572, and 573 for each of the six MER stations as a function of C_{LOCAL}/K_{A_2}. M_0 is the Mach number where the intercept initially deviates from the intercept predicted at M = 0.5. Equations have been developed to predict the delta (incremental) intercept change from that predicted at M = 0.5 for each of the remaining Mach break points (M_1, M_2, etc.) for each of the six MER stations. These equations are presented below.

BREAK 1 (M_1):

MER STATIONS 1, 2, 3, and 5 (MS1,2,3,5):

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0_1 \\ MS1,2,3,5}} = \left[\Delta C_{N_{\substack{\alpha=0_1 \\ MS1,2,3,5}}} + \Delta C_{N_{\substack{\alpha=0_1 \\ \overset{INTF}{MS1,2,3,5}}}}\right] K_{SCALE_{NF}} K_{\Lambda_2}$$

where:

$\Delta C_{N_{\alpha=0_1}}$ - Incremental $C_{N_{\alpha=0}}$ at $M=M_1$ presented as a function of C_{LOCAL}/K_{Λ_2}.

MER STA 1 - Figure 574
MER STA 2 - Figure 574
MER STA 3 - Figure 575
MER STA 5 - Figure 575

$\Delta C_{N_{\substack{\alpha=0_1 \\ INTF}}}$ - Incremental $C_{N_{\alpha=0}}$ due to the interference effect of the fuselage for high wing aircraft.

MER STA 1 - Figure 576
MER STA 2 - Figure 576
MER STA 3 - Figure 576
MER STA 5 - Figure 576

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Wing sweep correction factor, $\frac{\cos \Lambda}{\cos 45^\circ}$, where Λ is the quarter-chord sweep angle of the aircraft wing.

MER STATIONS 4 and 6 (MS4,6):

$$\Delta\left(\frac{NF}{q}\right)_{\alpha=0_1} = \left(\Delta C_{N_{\alpha=0_1}} + \Delta C_{N_{\alpha=0_1}} \frac{\ell_{LE_F}}{C} + \Delta C_{N_{\alpha=0_1}}\right) \cdot K_{SCALE_{NF}} K_{\Lambda_2}$$

where:

$\Delta C_{N_{\alpha=0_1}}$ - Incremental $C_{N_{\alpha=0}}$ at $M=M_1$ presented as a function of $C_{LOCAL} K_{\Lambda_2}$.

MER STA 4 - Figure 577

MER STA 6 - Figure 577

$\Delta C_{N_{\alpha=0_1}} \frac{\ell_{LE_F}}{C}$ - Incremental $C_{N_{\alpha=0}}$ based on the distance from the wing leading edge to the nose of the store on MER STATION 2 measured in a wing plan view divided by the local wing chord, positive.

MER STA 4 - Figure 578

MER STA 6 - Figure 578

$\Delta C_{N_{\alpha=0_1}}$ - Incremental $C_{N_{\alpha=0}}$ due to the interference effect of the fuselage for high wing aircraft.

MER STA 4 - Figure 579

MER STA 6 - Figure 579

Break 2 (M_2):

MER STATIONS 1 and 2 (MS1,2):

$$\Delta\left(\frac{NF}{q}\right)_{\alpha=0_2} = \left[\Delta C_{N_{\alpha=0_2}} + \Delta C_{N_{\alpha=0_2}}\right] K_{SCALE_{NF}} K_{\Lambda_2}$$

where:

$\Delta C_{N_{\alpha=0_2}}$ - Defined the same as in Break 1.
MER STA 1 - Figure 580
MER STA 2 - Figure 580

$\Delta C_{N_{\alpha=0_{2_{INTF}}}}$ - Defined the same as in Break 1.
MER STA 1 - Figure 581
MER STA 2 - Figure 581

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Defined in Break 1

MER STATIONS 3 and 5 (MS3,5):

$$\Delta\left(\frac{}{q}\right)_{\alpha=0_{2_{MS3,5}}} = \Delta C_{N_{\alpha=0_{2_{MS3,5}}}} K_{SCALE_{NF}} K_{\Lambda_2}$$

where:

$\Delta C_{N_{\alpha=0_2}}$ - Defined the same as in Break 1.
MER STA 3 - Figure 582
MER STA 5 - Figure 582

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Defined in Break 1

MER STATIONS 4 and 6 (MS4,6):

$$\Delta\left(\frac{NF}{q}\right)_{\alpha=0_{2}}_{MS4,6} = \left(\Delta C_{N_{\alpha=0_{2}}}_{MS4,6} + \Delta C_{N_{\alpha=0_{2}}}_{\frac{\ell_{LE_F}}{C}_{MS4,6}} + \Delta C_{N_{\alpha=0_{2}}}_{INTF\ MS4,6}\right) \cdot K_{SCALE_{NF}} K_{\Lambda_2}$$

where:

$\Delta C_{N_{\alpha=0_{2}}}$ - Incremental $C_{N_{\alpha=0}}$ at $M=M_2$ presented as a function of C_{LOCAL}/K_{Λ_2}.

MER STA 4 - Figure 583

MER STA 6 - Figure 583

$\Delta C_{N_{\alpha=0_{2}}}$ $\frac{\ell_{LE_F}}{C}$ - Incremental $C_{N_{\alpha=0}}$ based on the distance from the wing leading edge to the nose of the store on MER STATION 2 measured in a wing plan view divided by the local wing chord, positive.

MER STA 4 - Figure 584

MER STA 6 - Figure 584

$\Delta C_{N_{\alpha=0_{2}}}$ INTF - Incremental $C_{N_{\alpha=0}}$ due to the interference effect of the fuselage for high wing aircraft.

MER STA 4 - Figure 585

MER STA 6 - Figure 585

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Defined above in Break 1.

Break 3 (M_3):

MER STATIONS 1,2,3 and 5 (MS1,2,3,5):

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0_3 \\ MS1,2,3,5}} = \Delta C_{N_{\substack{\alpha=0_3 \\ MS1,2,3,5}}} K_{SCALE_{NF}} K_{\Lambda_2}$$

where:

$\Delta C_{N_{\alpha=0_3}}$ - Incremental $C_{N_{\alpha=0}}$ at $M=M_3$ presented as a function of $C_{LOCAL} K_{\Lambda_2}$ for MS1,2 and as a function of η for MS3,5.

MER STA 1,2 - Figure 586

MER STA 3,5 - Figure 587

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

K_{Λ_2} - Defined in Break 1.

MER STATION 4 (MS4):

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0_3 \\ MS4}} = \left(\Delta C_{N_{\substack{\alpha=0_3 \\ MS4}}} + \Delta C_{N_{\substack{\alpha=0_3 \\ \frac{\ell_{LE_F}}{C} \\ MS4}}} + \Delta C_{N_{\substack{\alpha=0_3 \\ INTF \\ MS4}}}\right) \cdot \left(K_{SCALE_{NF}} K_{\Lambda_2}\right)$$

where:

$\Delta C_{N_{\alpha=0_3}}$ - Incremental $C_{N_{\alpha=0}}$ at $M=M_3$ presented as a function of $C_{LOCAL} K_{\Lambda_2}$.

MER STA 4 - Figure 588

$\Delta C_{N_{\substack{\alpha=0_3 \\ \frac{\ell_{LE_F}}{C}}}}$ - Incremental $C_{N_{\alpha=0}}$ based on the distance from the wing leading edge to the nose of the store on MER STATION 2 measured in a wing plan view divided by the local wing chord, postive.

MER STA 4 - Figure 589.

$\Delta C_{N_{\alpha=0_{3}}}$ - Incremental $C_{N_{\alpha=0}}$ due to the interference effect of the fuselage for high wing aircraft. MER STA 4 - Figure 590.

$K_{SCALE_{NF}}$ - Defined in Section IV , ft^2.

K_{Λ_2} - Defined above in Break 1

MER STATION 6 (MS6):

No break 3

To compute $\left(\frac{NF}{q}\right)_{\alpha=0}$ at M = x, first determine from Figures 571, 572, or 573 between Mach number break points M = x occurs. Let M_{LOW} be the lower Mach break and M_{HI} be the higher Mach break. Compute $\left(\frac{NF}{q}\right)_{\alpha=0}$ at M = x from the expression below.

$$\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ M=x}} = \left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ PRED}} + \Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ M_{LOW}}} + \left(\frac{x-M_{LOW}}{M_{HI} - M_{LOW}}\right)\left[\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ M_{HI}}} - \Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ M_{LOW}}}\right]$$

If $x \leq M_0$, $\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ M=x}}$ will be the value obtained in Subsection 4.3.1.3 (the initial term in the above equation).

A numerical example illustrating the application of the above equation is presented in Subsection 4.1.1.2.

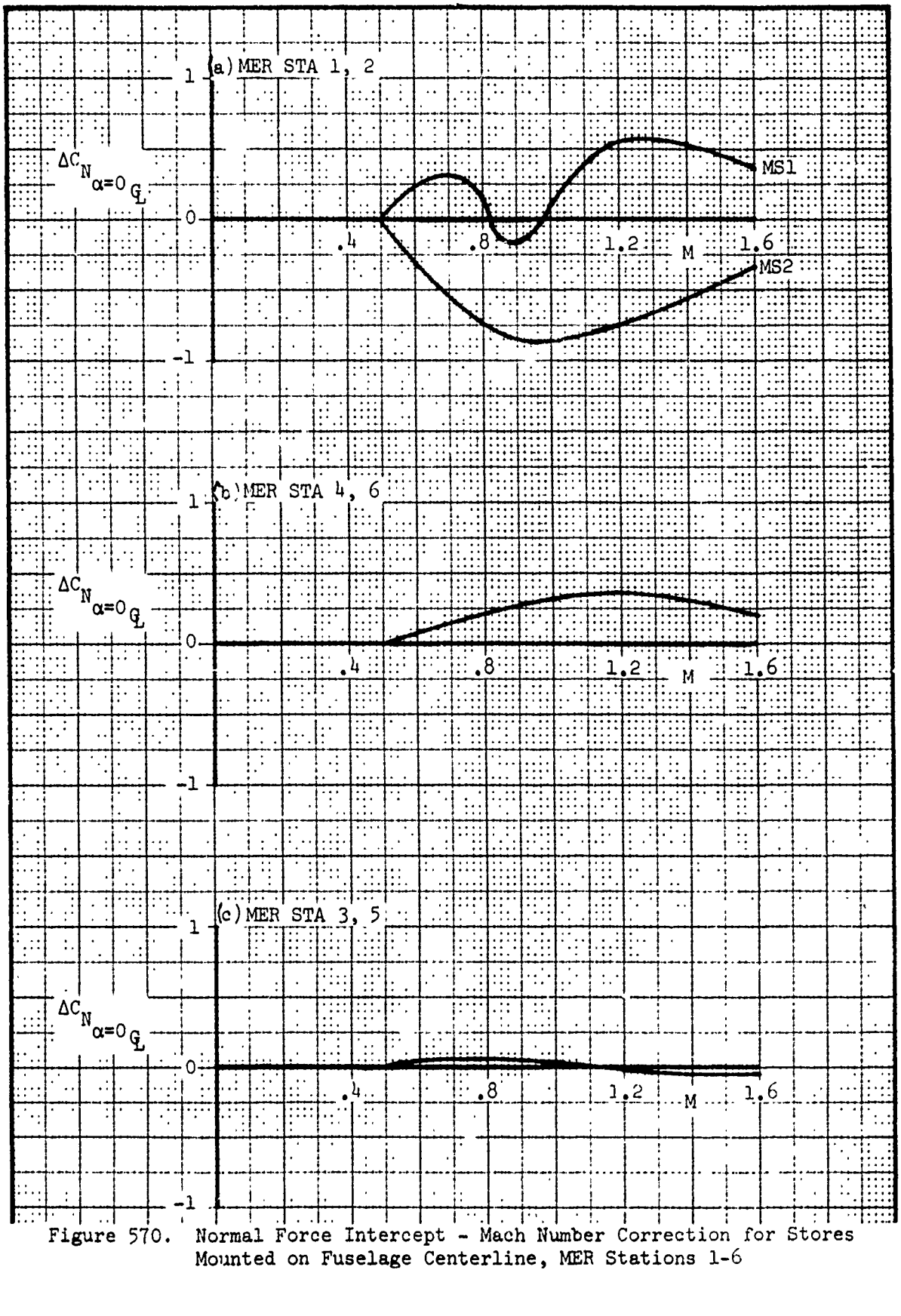


Figure 570. Normal Force Intercept - Mach Number Correction for Stores Mounted on Fuselage Centerline, MER Stations 1-6

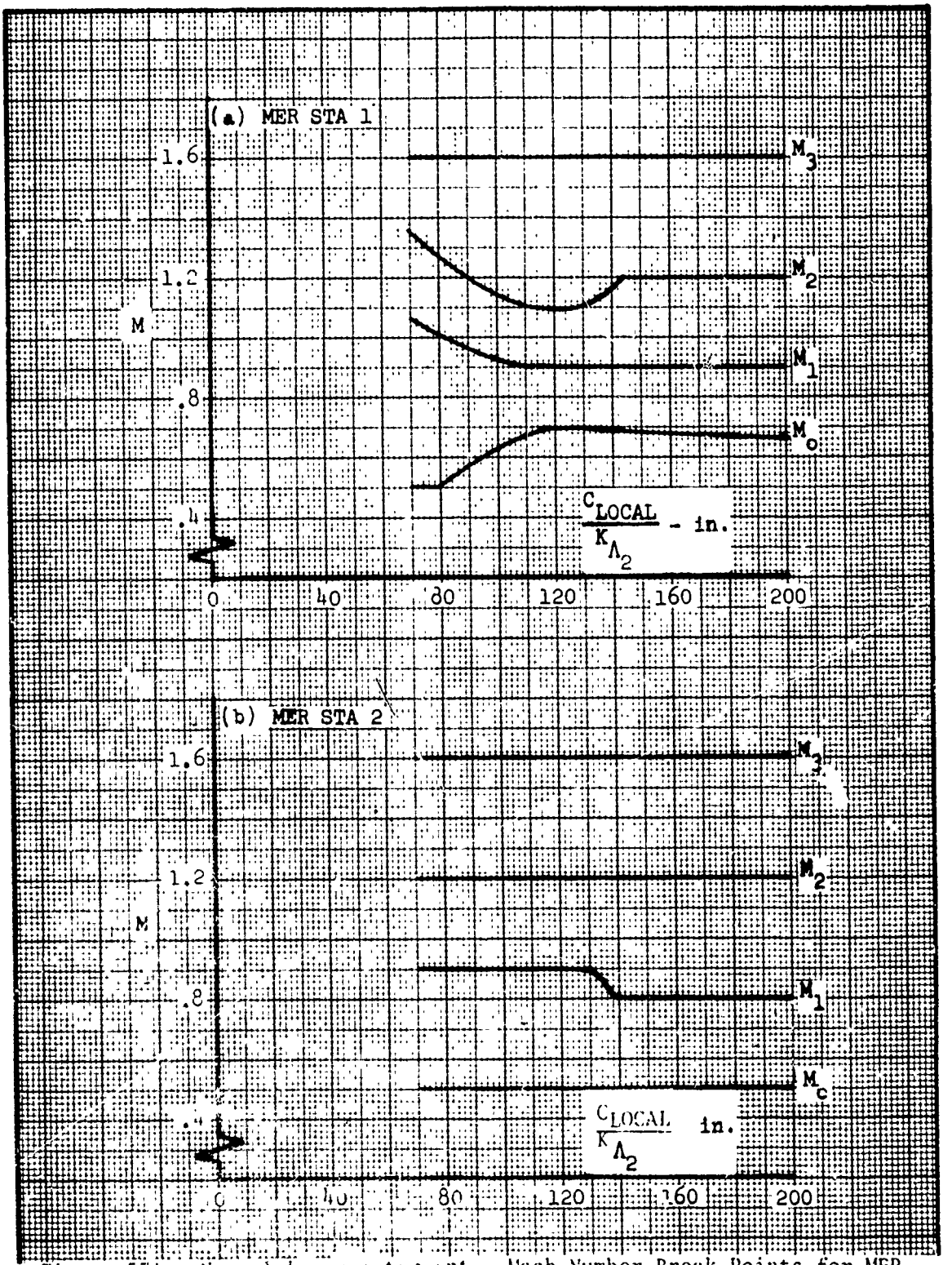


Figure 5-1 Normal Force Intercept - Mach Number Break Points for MER Stations 1 and 2

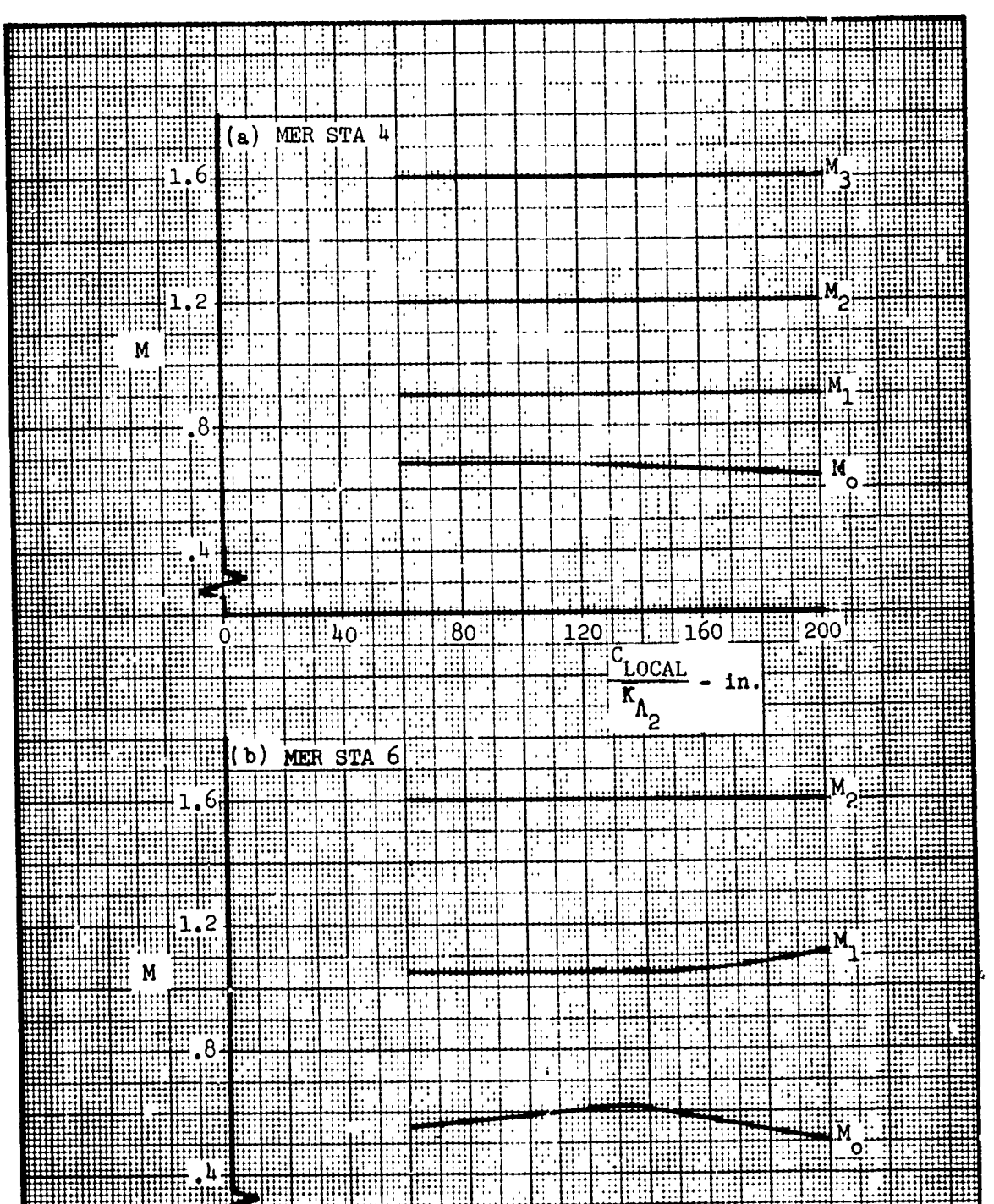


Figure 572. Normal Force Intercept - Mach Number Break Points for MER Stations 4 and 6

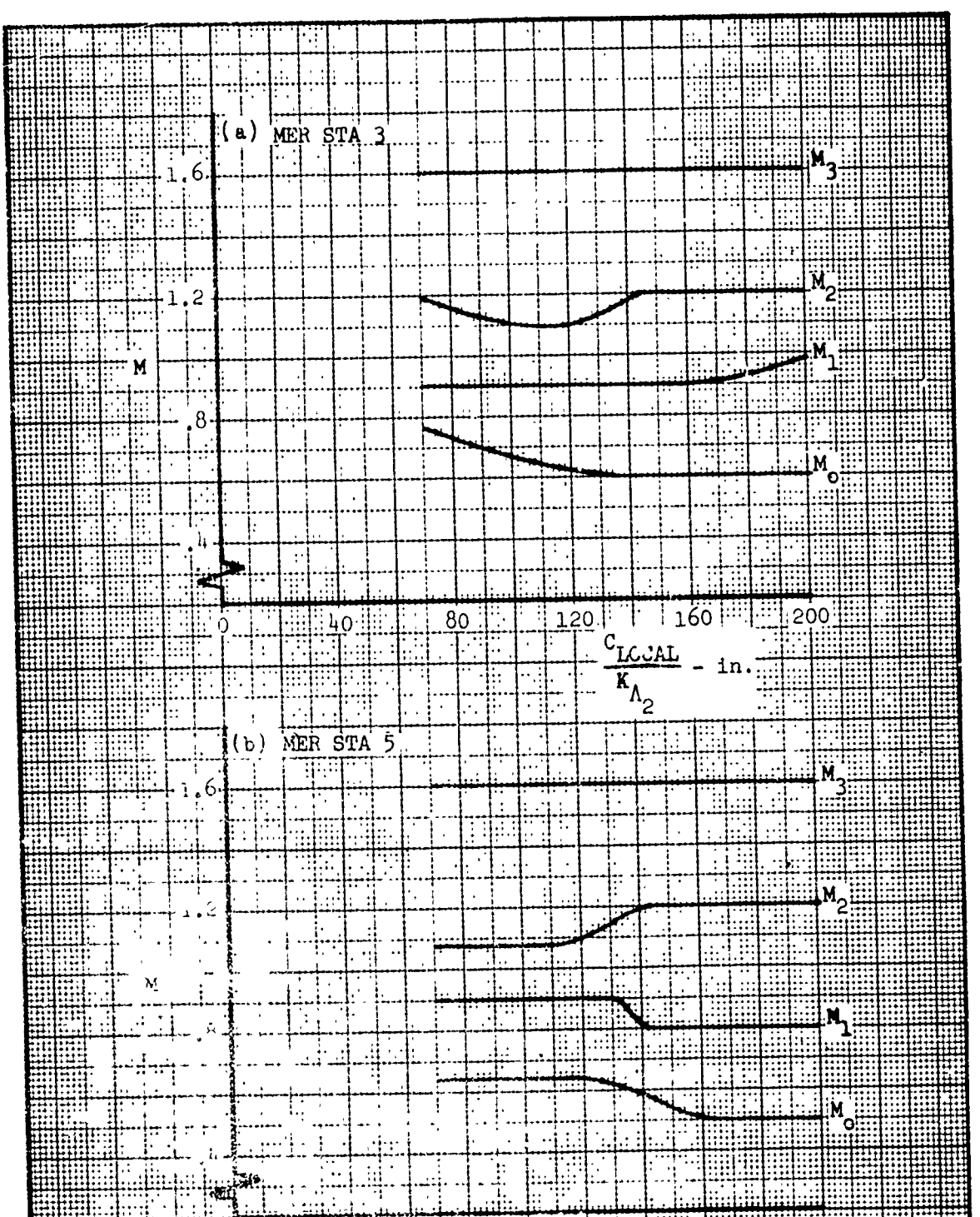


Figure [illegible] Mach Number Break Points for MER

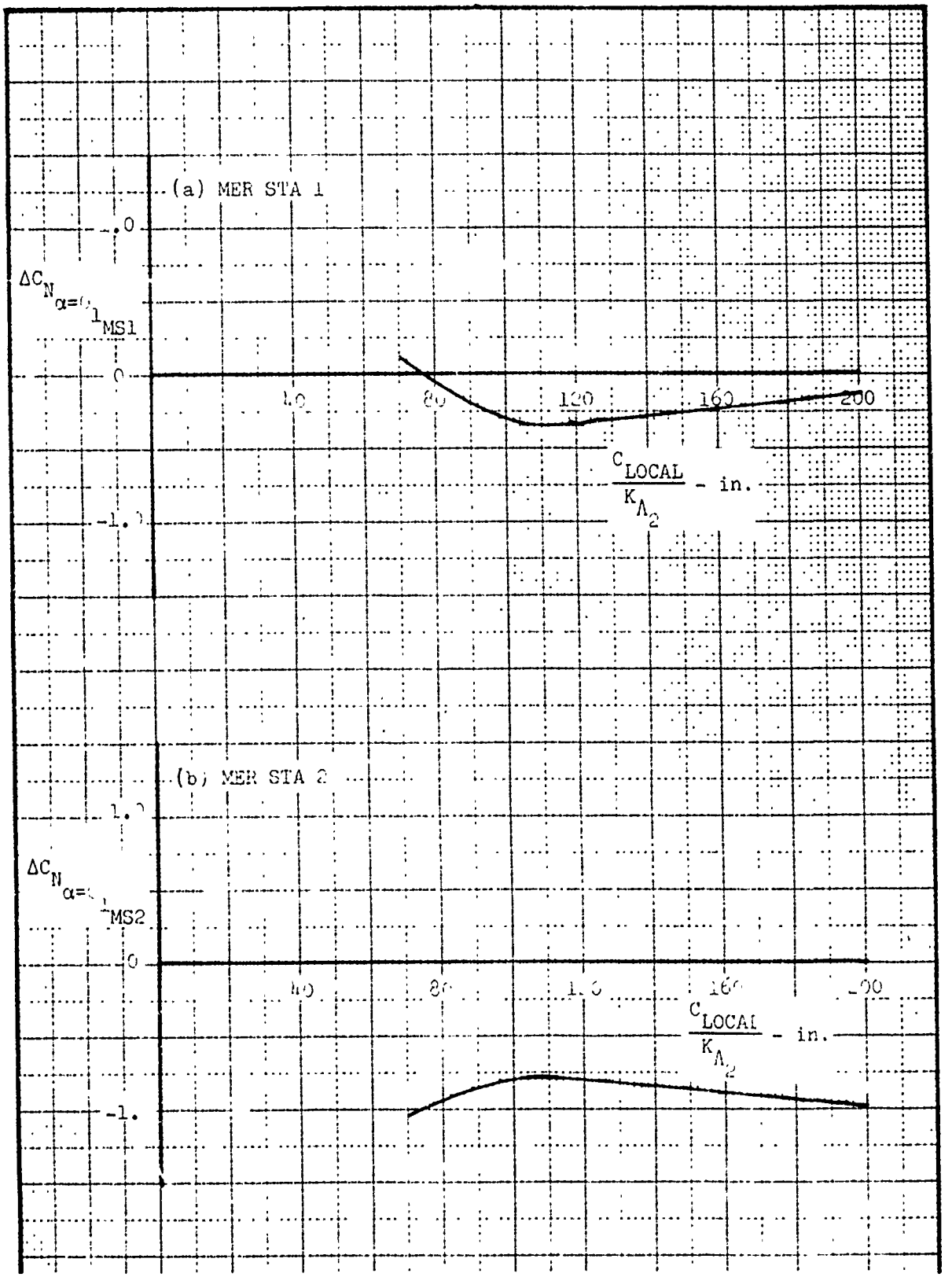


Figure 57b. Normal Force Intercept - Incremental Coefficient at Break 1 for MER Stations 1 and 2

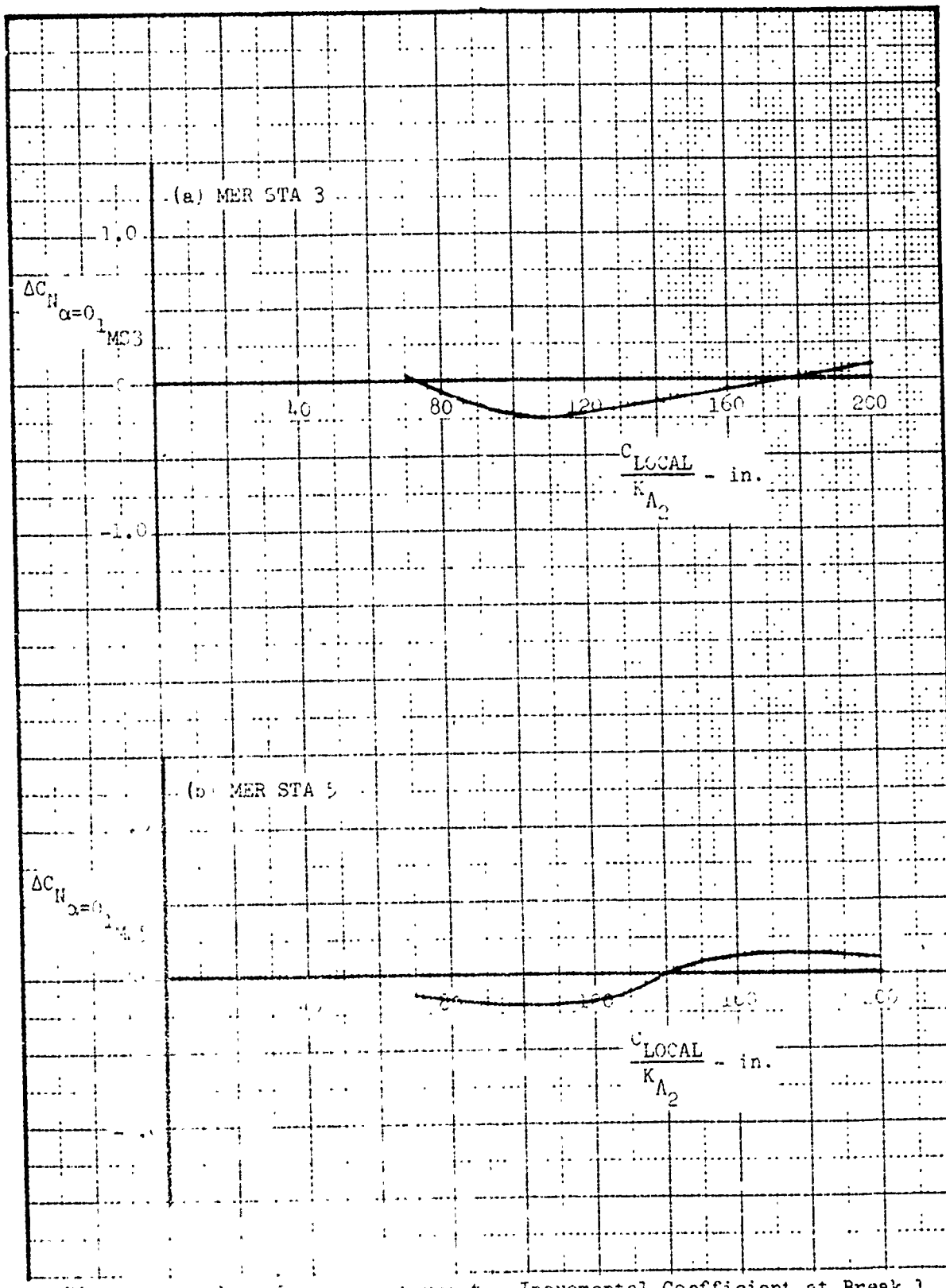


Figure [illegible] - Incremental Coefficient at Break 1

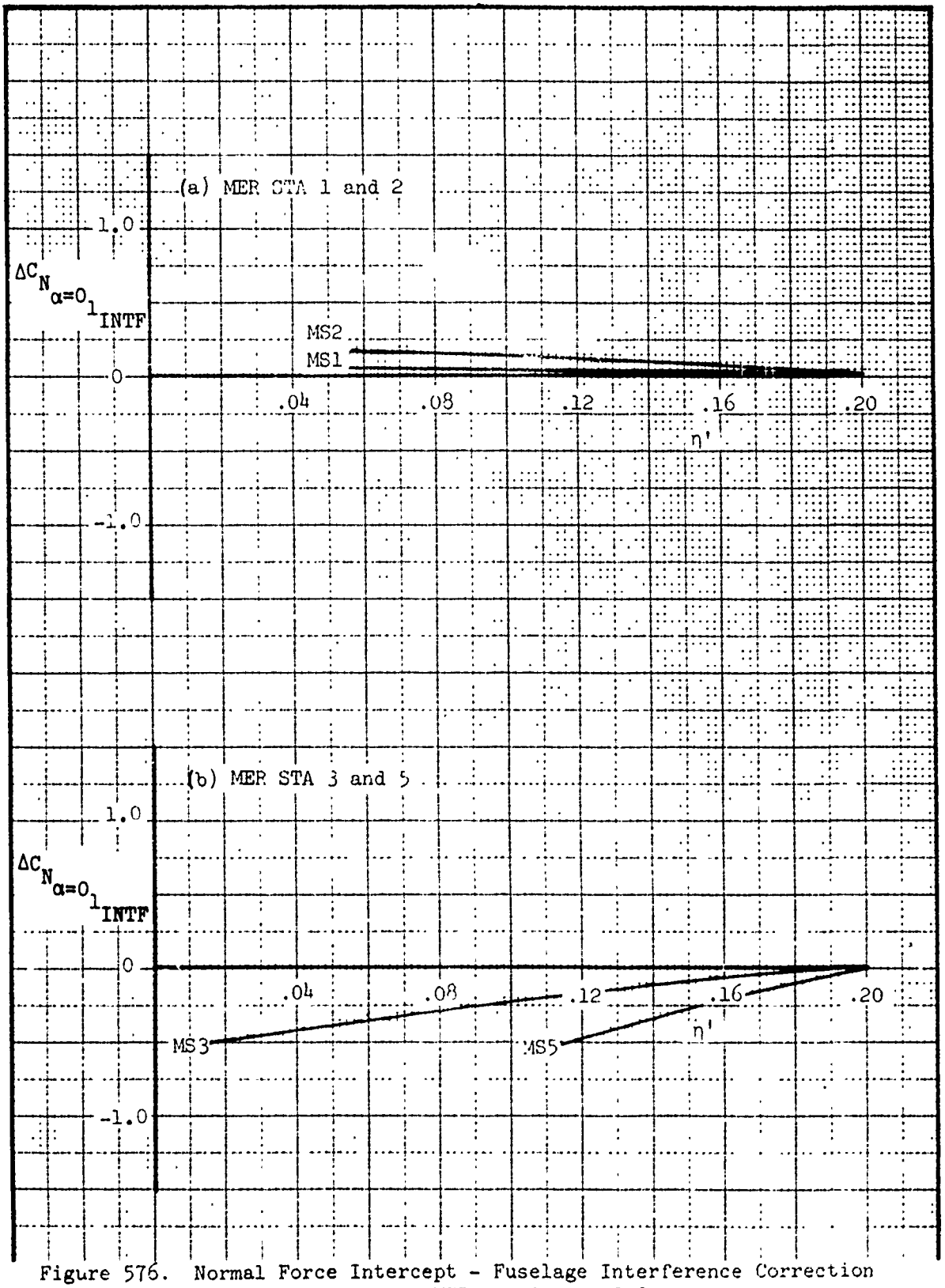


Figure 576. Normal Force Intercept - Fuselage Interference Correction at Mach Break 1 for MER Stations 1,2,3, and 5

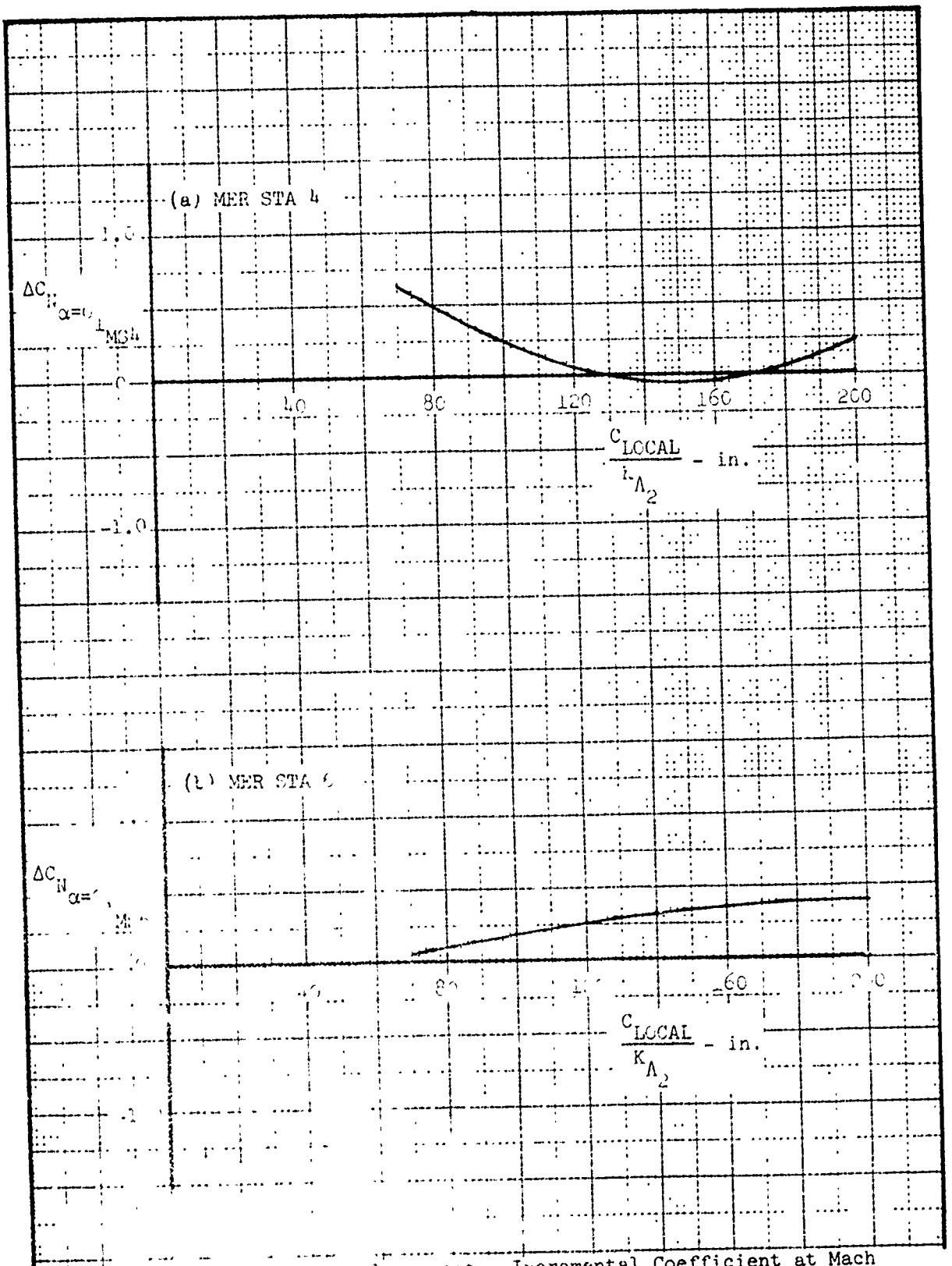


Figure [illegible] - Incremental Coefficient at Mach [illegible] MER [illegible] and 6

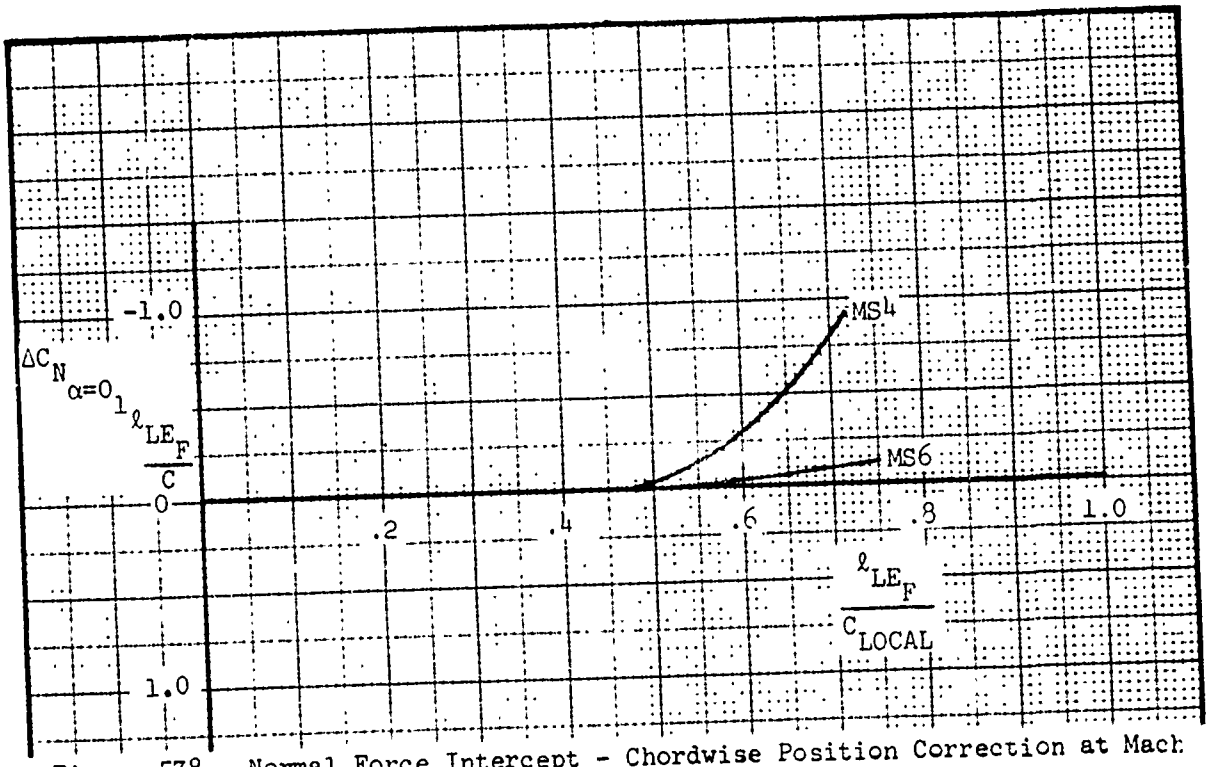


Figure 578. Normal Force Intercept - Chordwise Position Correction at Mach Break 1 for MER Stations 4 and 6

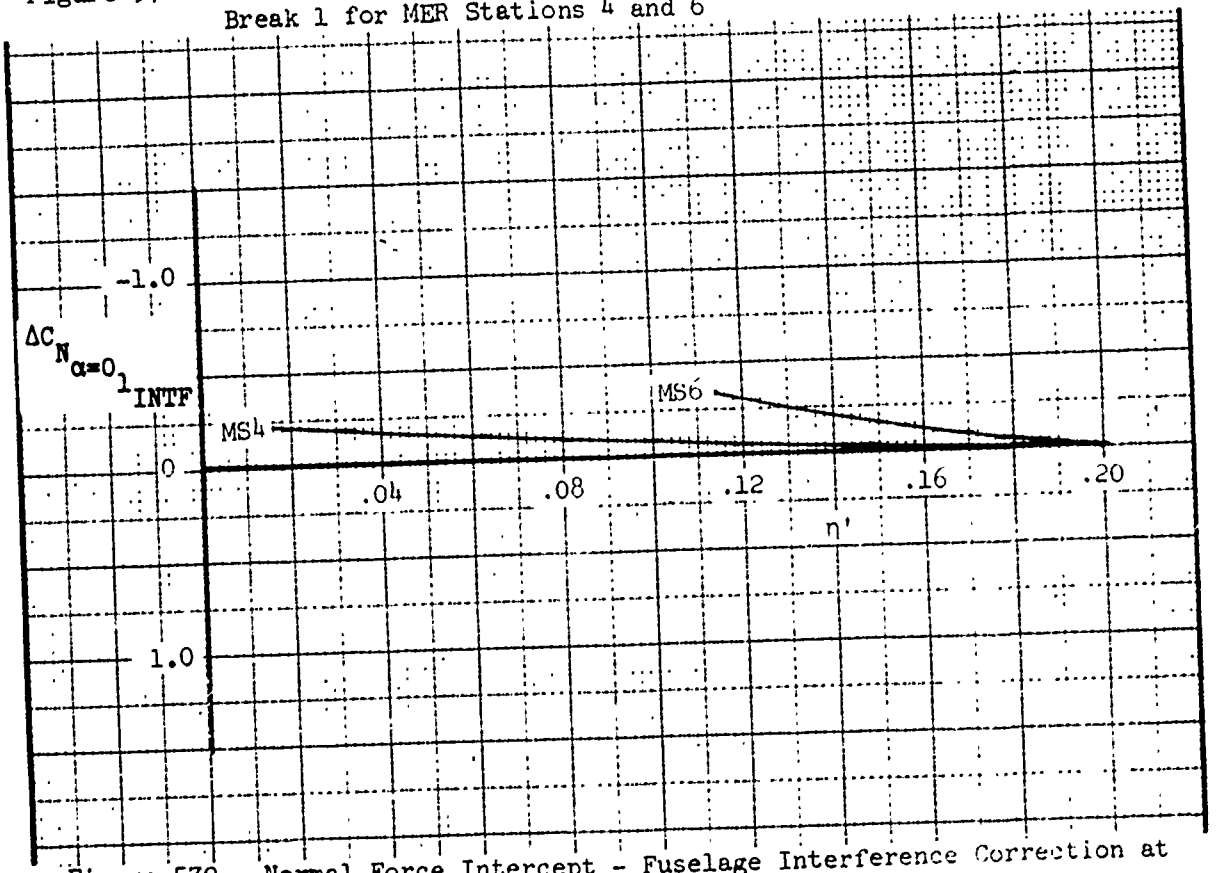


Figure 579. Normal Force Intercept - Fuselage Interference Correction at Mach Break 1 for MER Stations 4 and 6

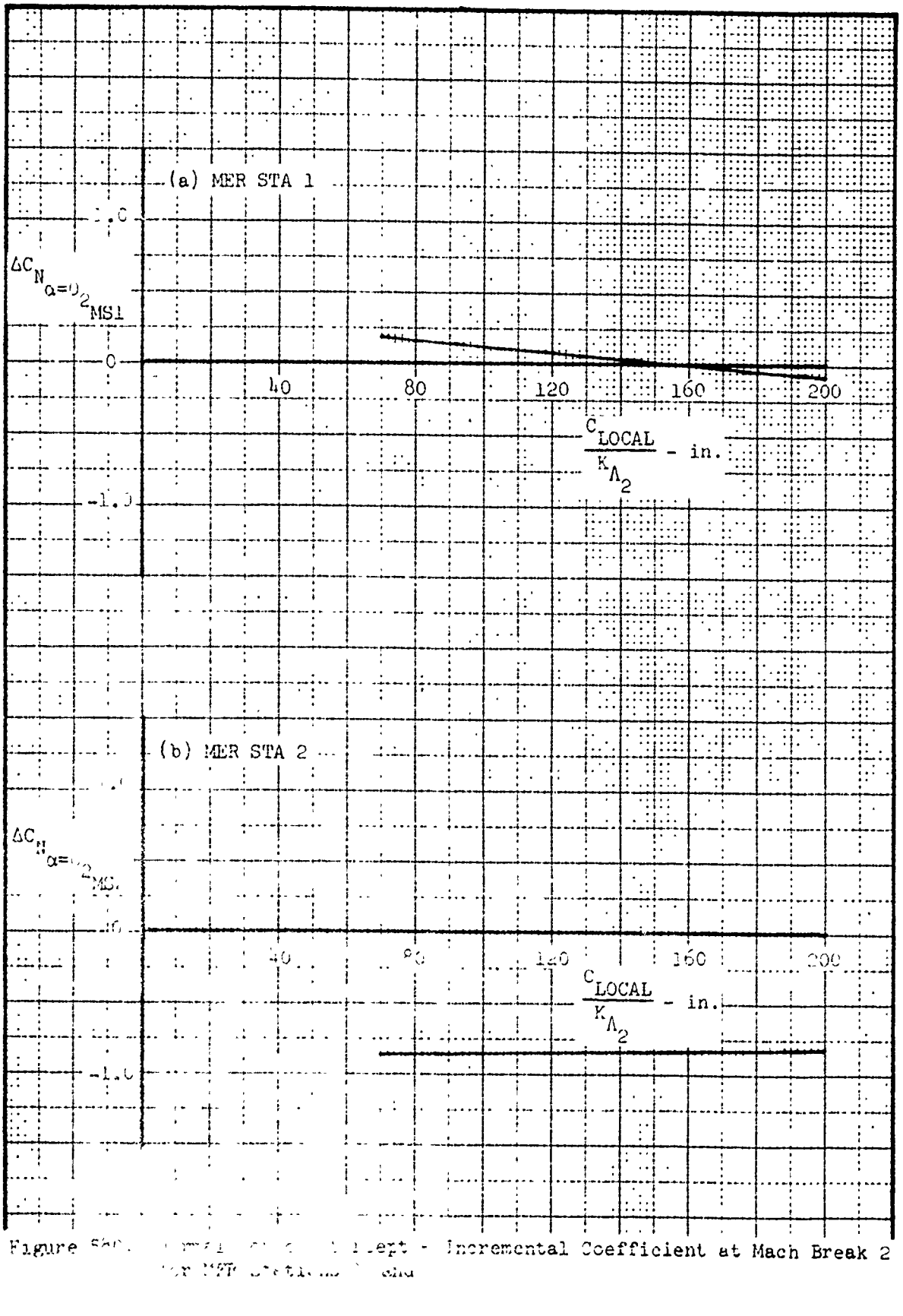


Figure 58. [illegible] Flap - Incremental Coefficient at Mach Break 2
[illegible]

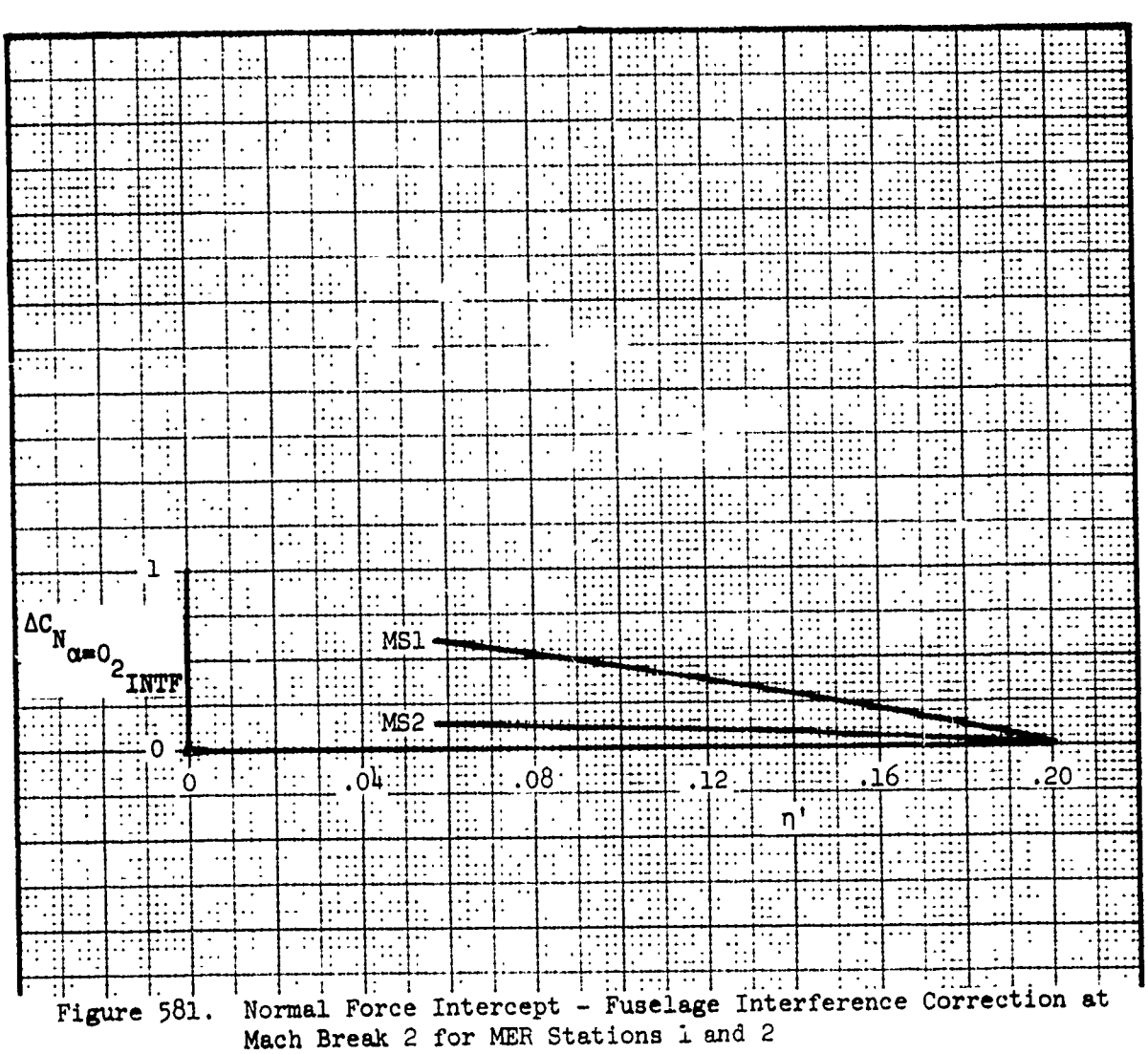


Figure 581. Normal Force Intercept - Fuselage Interference Correction at Mach Break 2 for MER Stations 1 and 2

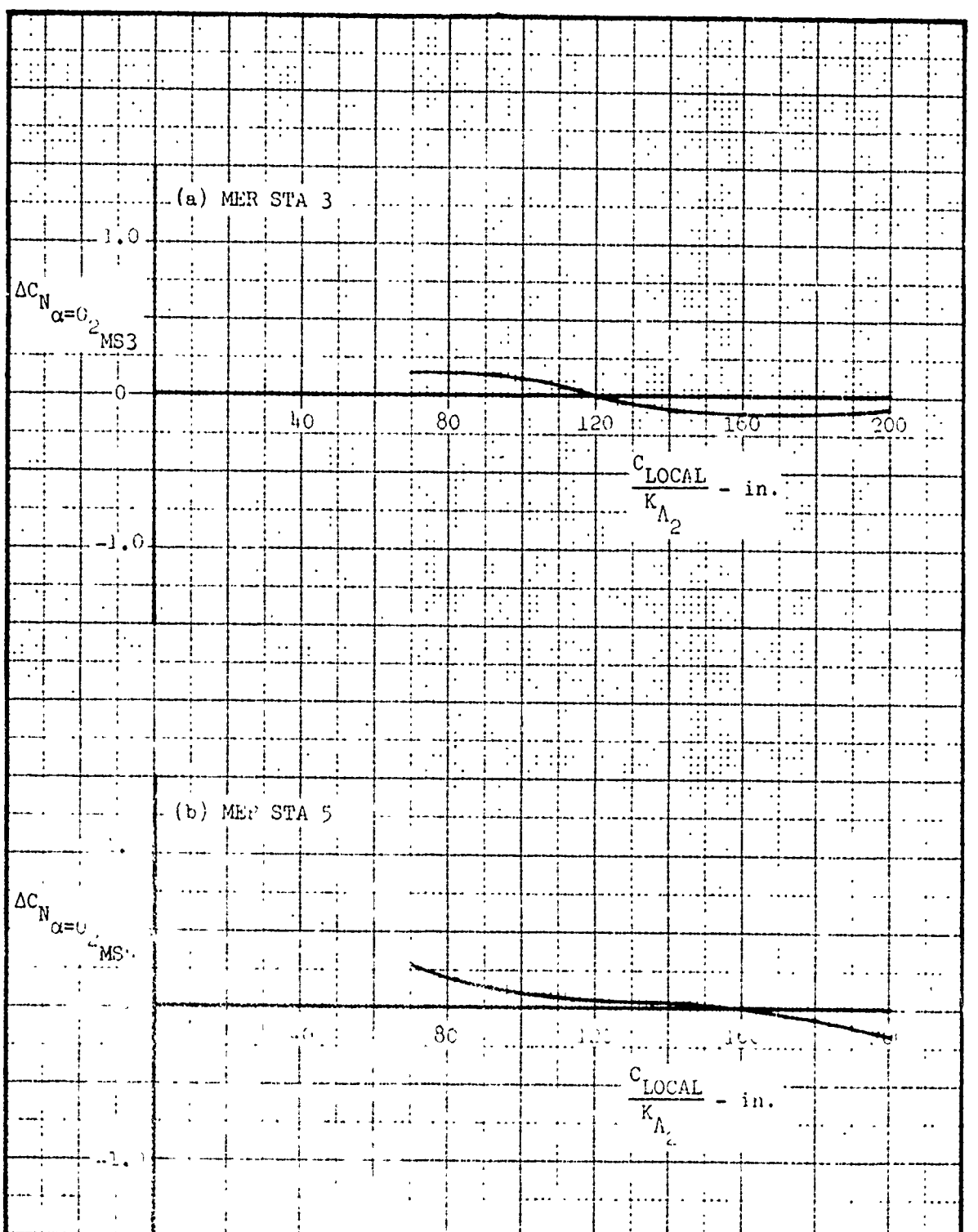


Figure ... Incremental Coefficient at Mach Break 2
... and ...

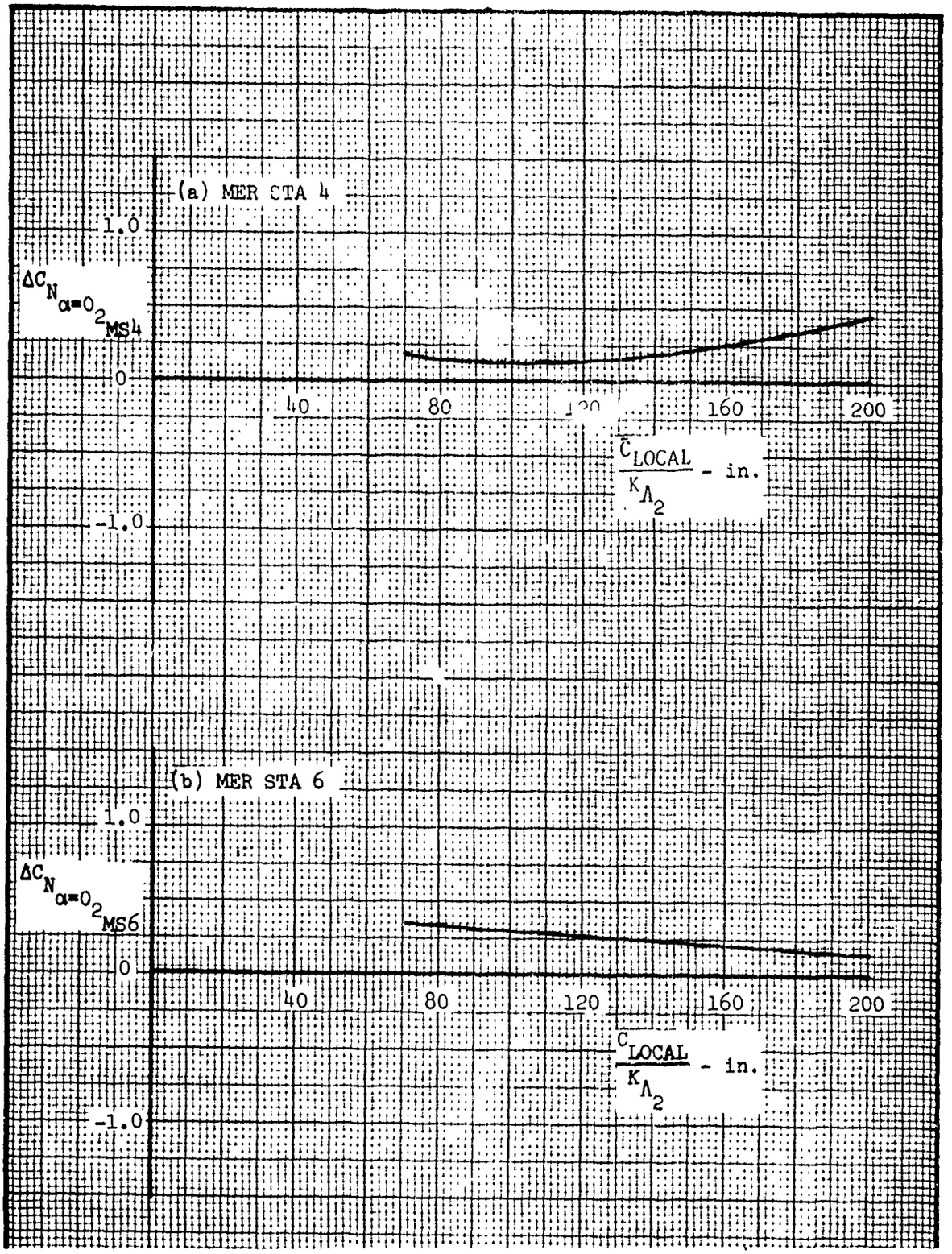


Figure 583. Normal Force Intercept - Incremental Coefficient at Mach Break 2 for MER Stations 4 and 6

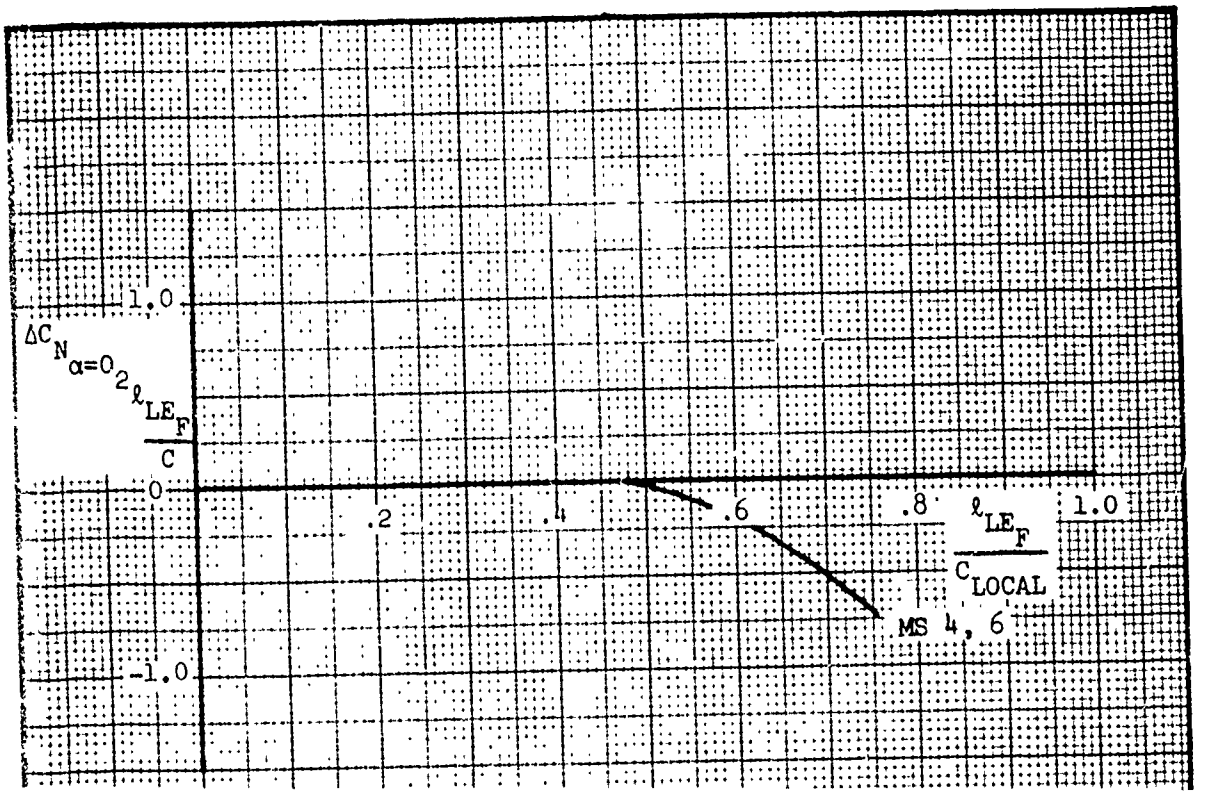


Figure 584. Normal Force Intercept - Chordwise Position Correction at Mach Break 2 for MER Stations 4 and 6

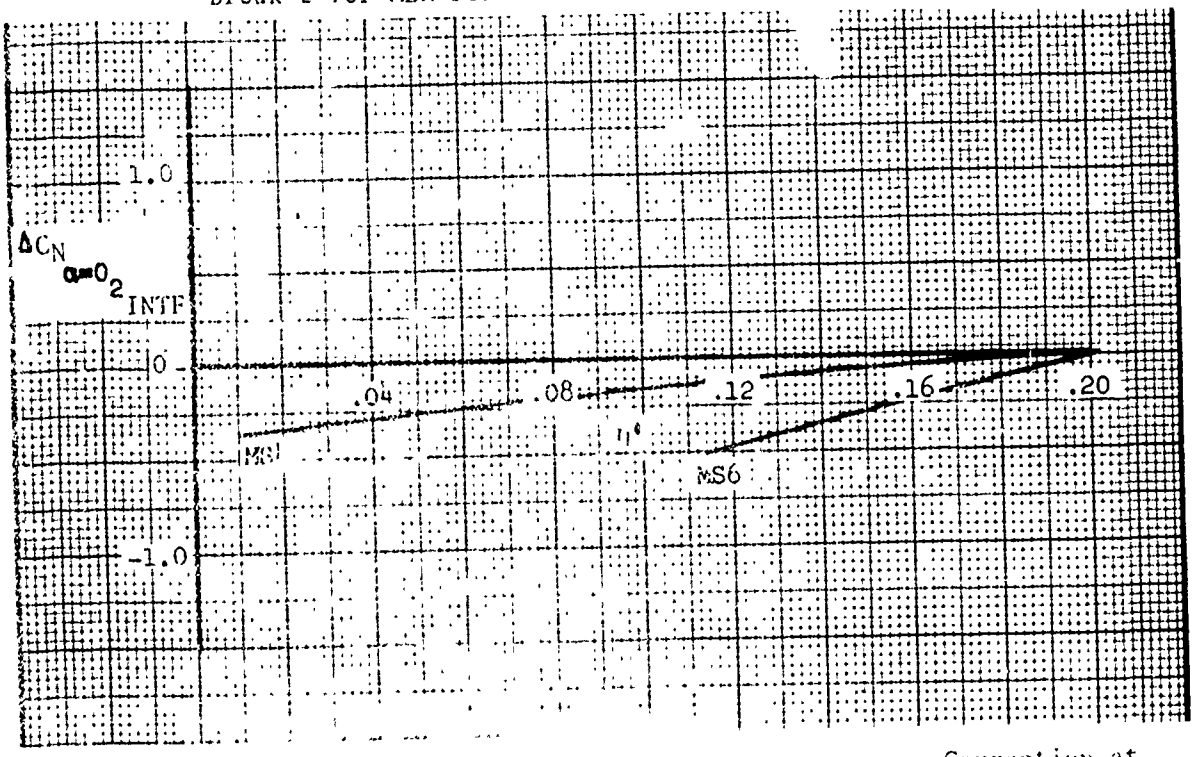


Figure 585. [illegible] Fuselage Interference Correction at [illegible] and 6

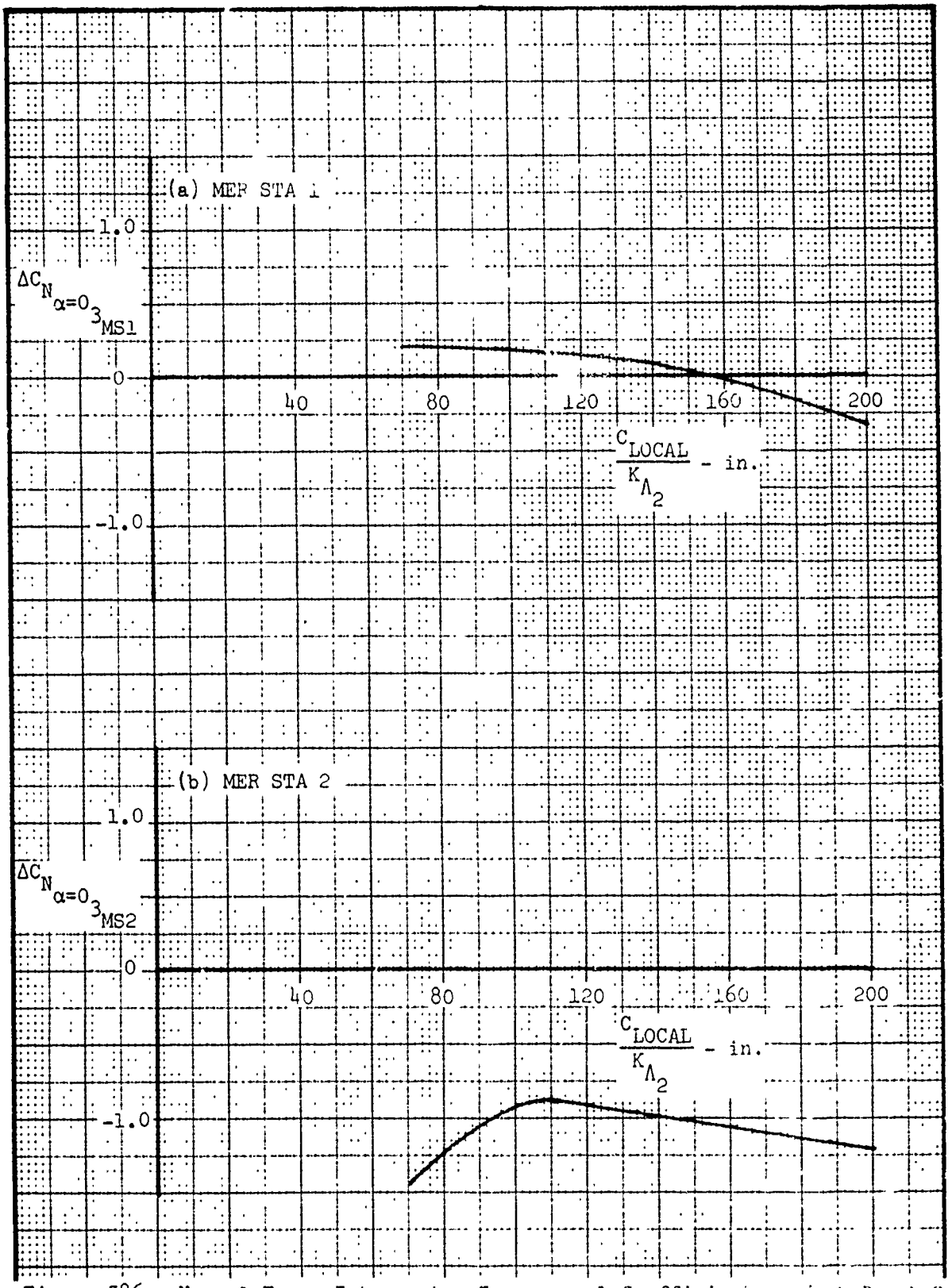


Figure 586. Normal Force Intercept - Incremental Coefficient at Mach Break 3 for MER Stations 1 and 2

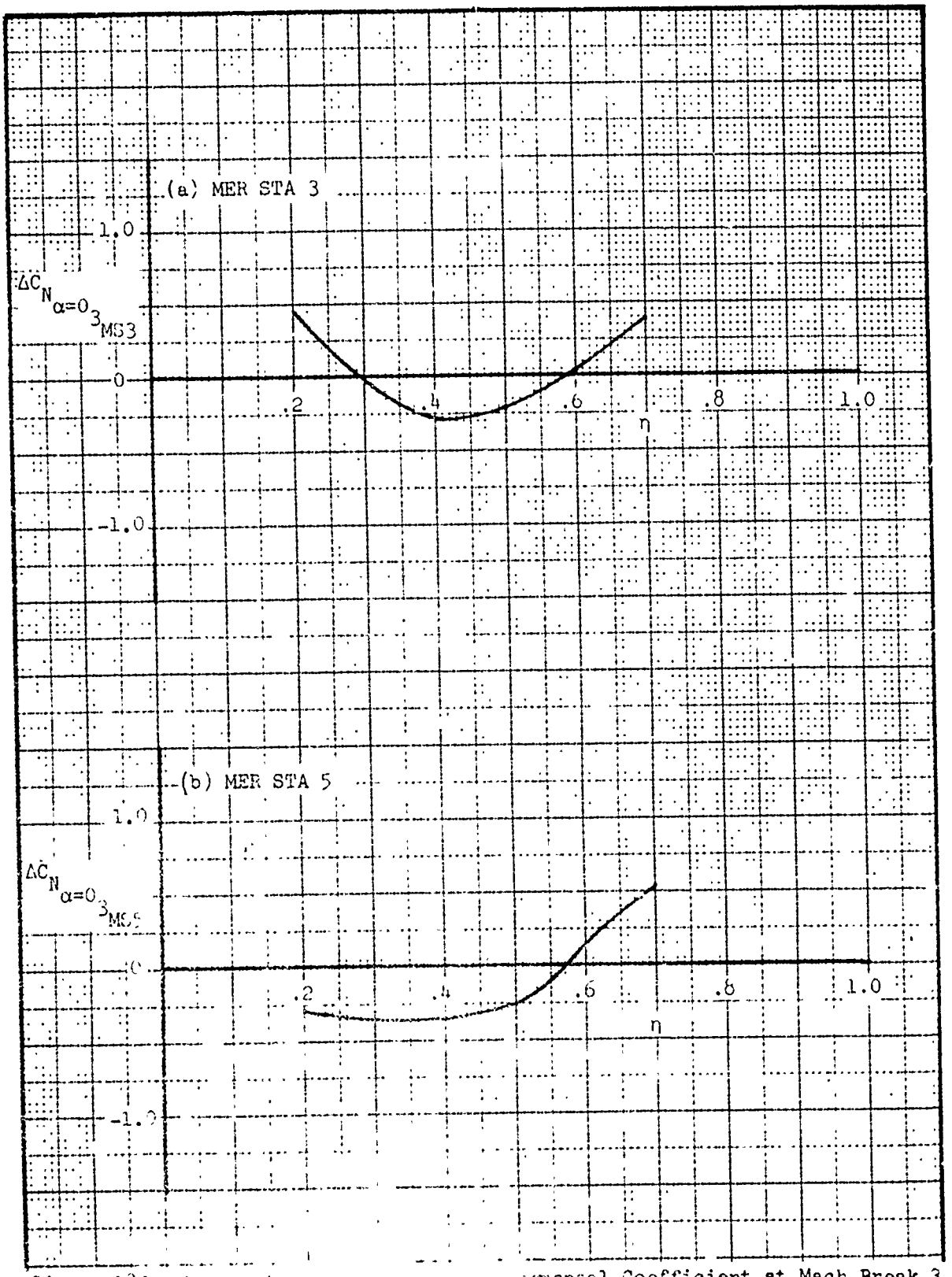


Figure 58. [illegible] mental Coefficient at Mach Break 3

[illegible]

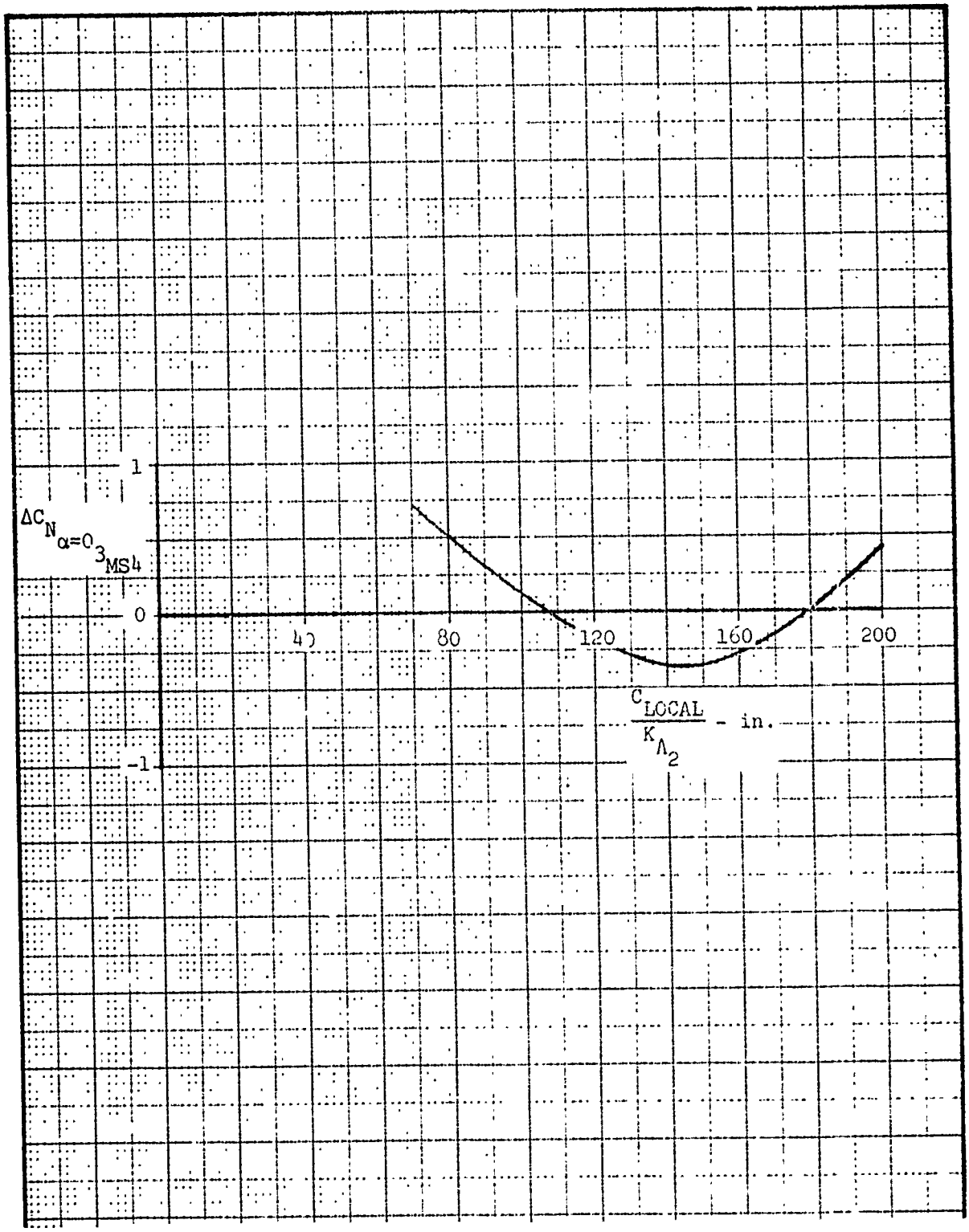


Figure 588. Normal Force Intercept - Incremental Coefficient at Mach Break 3 for MER Station 4

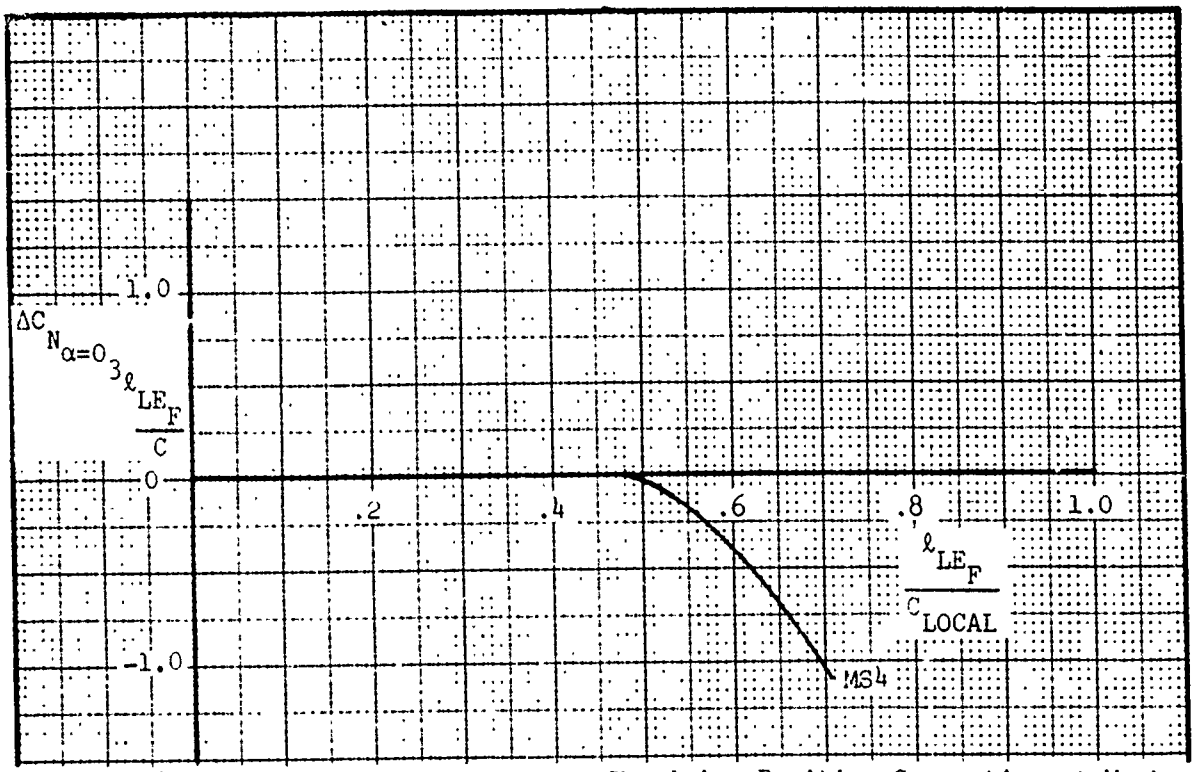


Figure 589. Normal Force Intercept - Chordwise Position Correction at Mach Break 3 for MER Station 4

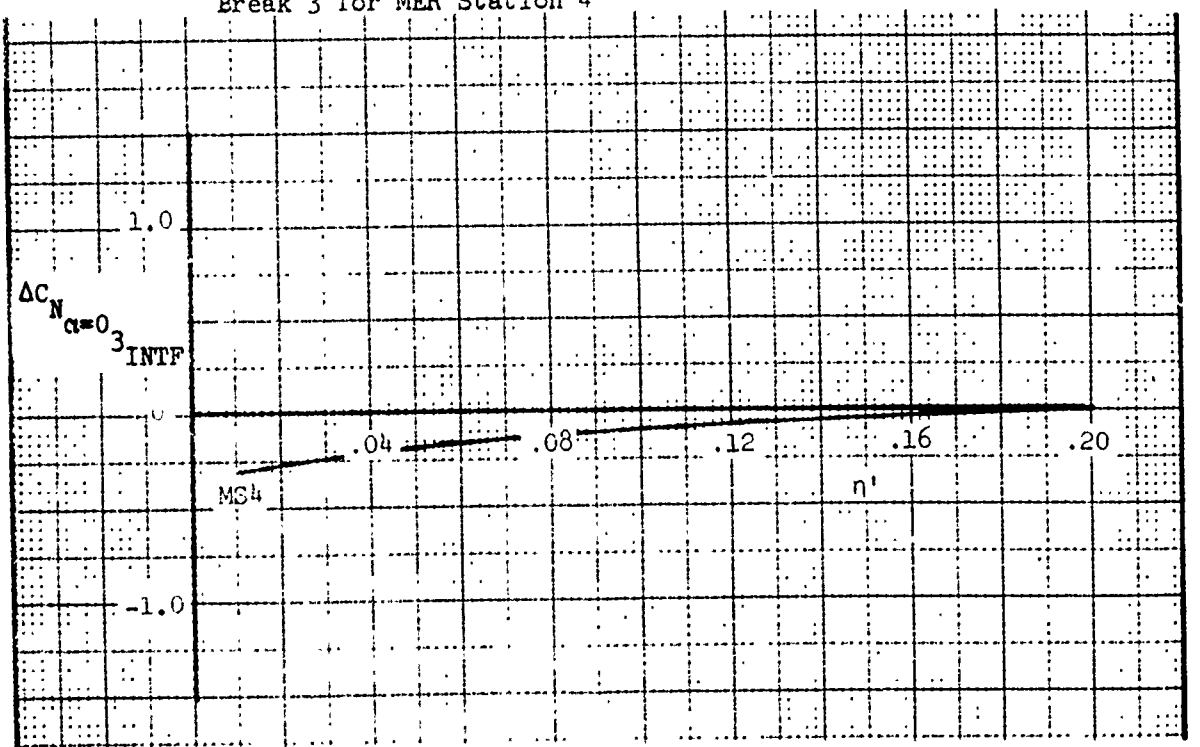


Figure 590. Normal Force Intercept - Fuselage Interference Correction at Mach Break 3 for MER Station 4

4.3.2 Increment - Aircraft Yaw

The captive store incremental normal force due to aircraft yaw is obtained as the difference between the yawed pitch polar and the zero-yaw pitch polar data as outlined in Section III. The incremental normal force slope, $\Delta\left(\frac{NF}{q}\right)_{\alpha}$, and intercept, $\Delta\left(\frac{NF}{q}\right)_{\alpha=0}$, thus obtained are linear with aircraft yaw angle; therefore, the incremental slope and intercept equations are derived and presented per degree of store yaw angle, β. The incremental airloads due to aircraft yaw are referenced to the coordinate system presented in Subsection 2.3.1.2.

To compute the incremental normal force slope, $\Delta\left(\frac{NF}{q}\right)_{\alpha}$, the following equation is used.

$$\Delta\left(\frac{NF}{q}\right)_{\alpha} = \Delta\left(\frac{NF}{q}\right)_{\alpha_{\beta}} \cdot \beta$$

where:

$\Delta\left(\frac{NF}{q}\right)_{\alpha_{\beta}}$ - Incremental normal force slope per degree β as obtained by the methods presented in the following sections, $\frac{ft^2}{deg^2}$.

β - Store yaw angle, deg, equal to $+\Psi_{A/C}$ for right wing store installation or $-\Psi_{A/C}$ for left wing store installations.

The equation and procedure for computing the incremental normal force intercept, $\Delta\left(\frac{NF}{q}\right)_{\alpha=0}$, due to aircraft yaw is similar to the above presentation for incremental normal force slope.

4.3.2.1 Slope Prediction

The incremental normal force slope prediction is divided into two sections, fuselage centerline-mounted stores and wing-mounted stores. The technique presented in this Subsection covers the Mach number range 0.5 to 1.6.

FUSELAGE CENTERLINE-MOUNTED STORES

MER STATIONS 1-6 (MS1-6):

$$\Delta\left(\frac{NF}{q}\right)_{\alpha_{\beta_{\mathfrak{L}}}} = \left(\Delta C_{N_{\alpha_{\beta_{\mathfrak{L}}}}}\right)_{MS1-6} K_{SCALE_{NF}}$$

where:

$\Delta C_{N_{\alpha_{\beta_{\mathfrak{L}}}}}$ - Incremental $C_{N_{\alpha_{\beta}}}$ presented as a function of Mach number, $\frac{1}{deg^2}$

MER STA 1 - Figure 591
MER STA 2 - Figure 592
MER STA 3 - Figure 591
MER STA 4 - Figure 592
MER STA 5 - Figure 591
MER STA 6 - Figure 592

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

WING-MOUNTED STORES

MER STATIONS 1, 3, and 5 (MS1,3,5):

$$\Delta\left(\frac{NF}{q}\right)_{\alpha_{\beta}} = \left(\Delta C_{N_{\alpha_{\beta}}} + K_{\frac{\ell_{LE_A}}{C}} \Delta C_{N_{\alpha_{\beta_{\frac{\ell_{LE_A}}{C}}}}}\right)_{MS1,3,5} K_{SCALE_{NF}}$$

where:

$\Delta C_{N_{\alpha_{\beta}}}$ - Incremental $C_{N_{\alpha}}$ per degree β presented as a function of wing spanwise position for Mach numbers 0.7, 0.9, 1.05, 1.2, and 1.6, $\frac{1}{deg^2}$, Table 15.

$K_{\frac{\ell_{LE_A}}{C}}$ - Proportioning factor based on the distance from the wing leading edge to the nose of the store on MER STATION 1 measured in the wing plan view divided by the local wing chord, positive, Figure 603.

$\Delta C_{N_{\alpha_{\beta_{\frac{\ell_{LE_A}}{C}}}}}$ - Incremental C_{N_α} per degree β based on ℓ_{LE_A}/C defined above and presented as a function of Mach number, $\frac{1}{deg^2}$.

MER STA 1 - Figure 604
MER STA 3 - Figure 604
MER STA 5 - Figure 604

$K_{SCALE_{NF}}$ - Defined in Section IV

MER STATIONS 2,4, and 6 (MS2,4,6):

$$\Delta\left(\frac{NF}{q}\right)_{\alpha_\beta}{}_{MS2,4,6} = \left(\Delta C_{N_{\alpha_\beta}}{}_{MS2,4,6}\right) K_{SCALE_{NF}}$$

where:

$\Delta C_{N_{\alpha_\beta}}$ - Incremental C_{N_α} per degree β presented as a function of wing spanwise position for Mach numbers 0.7, 0.9, 1.05, 1.2, and 1.6, $\frac{1}{deg^2}$, Table 15.

$K_{SCALE_{NF}}$ - Defined in Section IV , ft^2.

The variation of $\Delta C_{N_{\alpha_\ell}}$ for MER STATIONS 1-6 is presented at distinct Mach numbers 0.7, 0.9, 1.05, 1.2, and 1.6. Table 15

presented below is a guide for locating the curves for $\Delta C_{N_{\alpha_\beta}}$ for each MER Station at the Mach numbers indicated above. For Mach numbers between 0.5 and 0.7, the value at M = 0.7 should be used in the computation. For Mach numbers between 0.7 and 1.6 other than those distinctly presented, linear interpolation should be used between the appropriate Mach numbers to obtain the required value for computation.

TABLE 15. INCREMENTAL NORMAL FORCE SLOPE COEFFICIENT DUE TO YAW - FIGURE LOCATION GUIDE

$\Delta C_{N_{\alpha_\beta}}$	MACH NUMBER				
	0.7	0.9	1.05	1.2	1.6
	Figure Numbers				
MER STA 1	593	595	597	599	601
MER STA 2	594	596	598	600	602
MER STA 3	593	595	597	599	601
MER STA 4	594	596	598	600	602
MER STA 5	593	595	597	599	601
MER STA 6	594	596	598	600	602

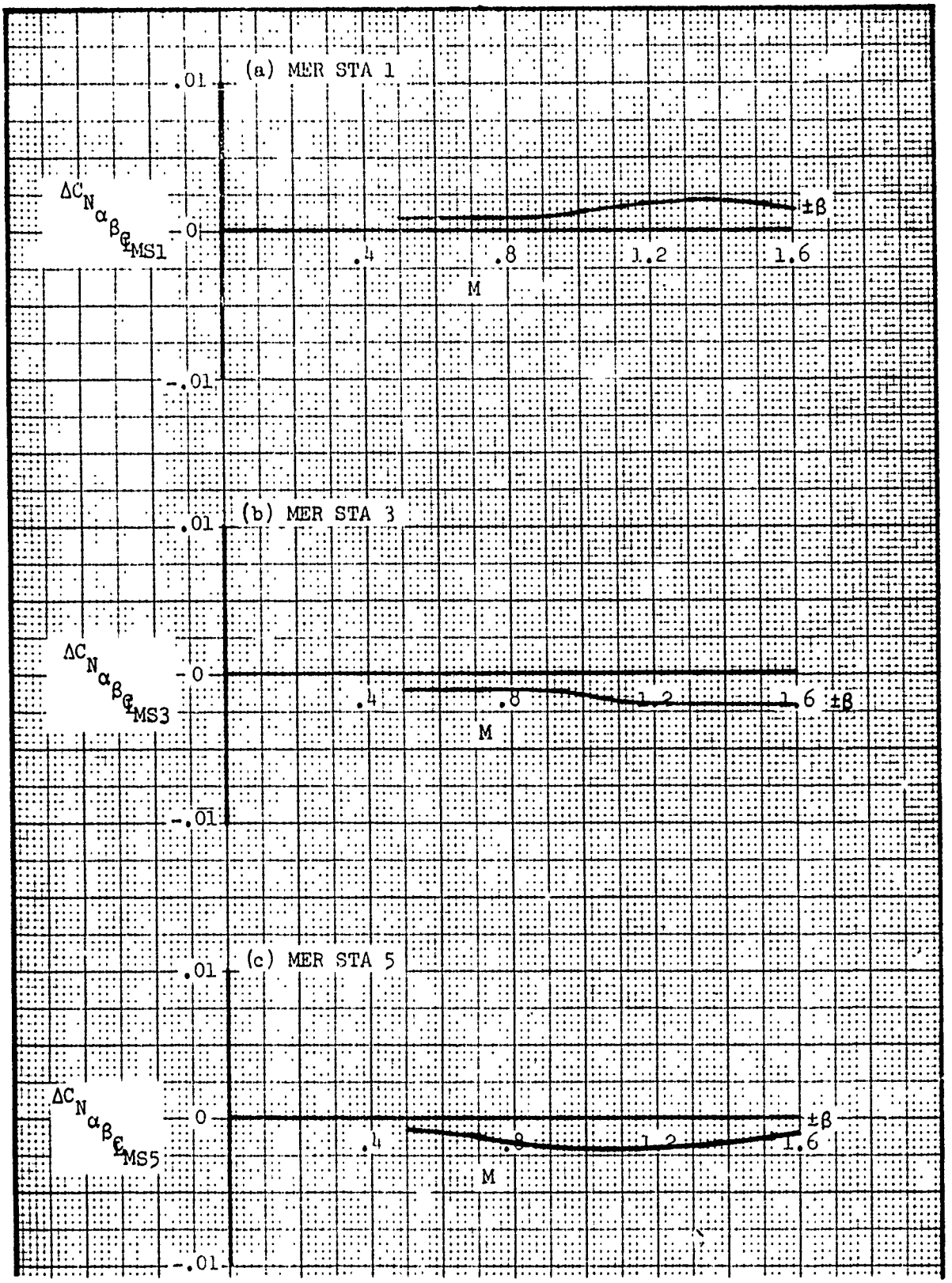


Figure 591. Incremental Normal Force Slope Due to Yaw - Coefficient for Stores Mounted on Fuselage Centerline, MER Stations 1, 3, and 5

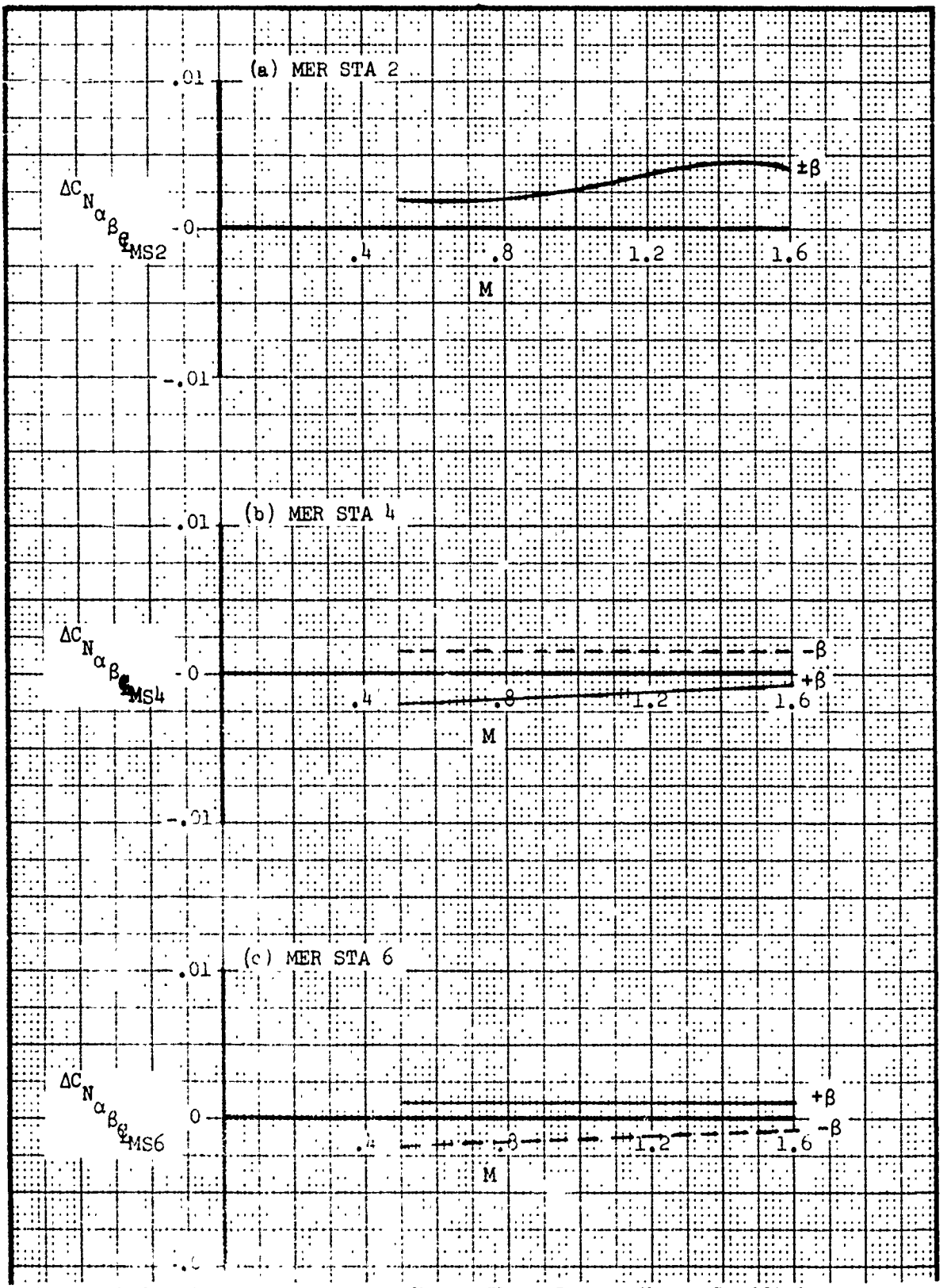


Figure 592 Incremental Normal Force Slope Due to Yaw - Coefficient for Stores Mounted on Fuselage Centerline, MER Stations 2, 4, and 6

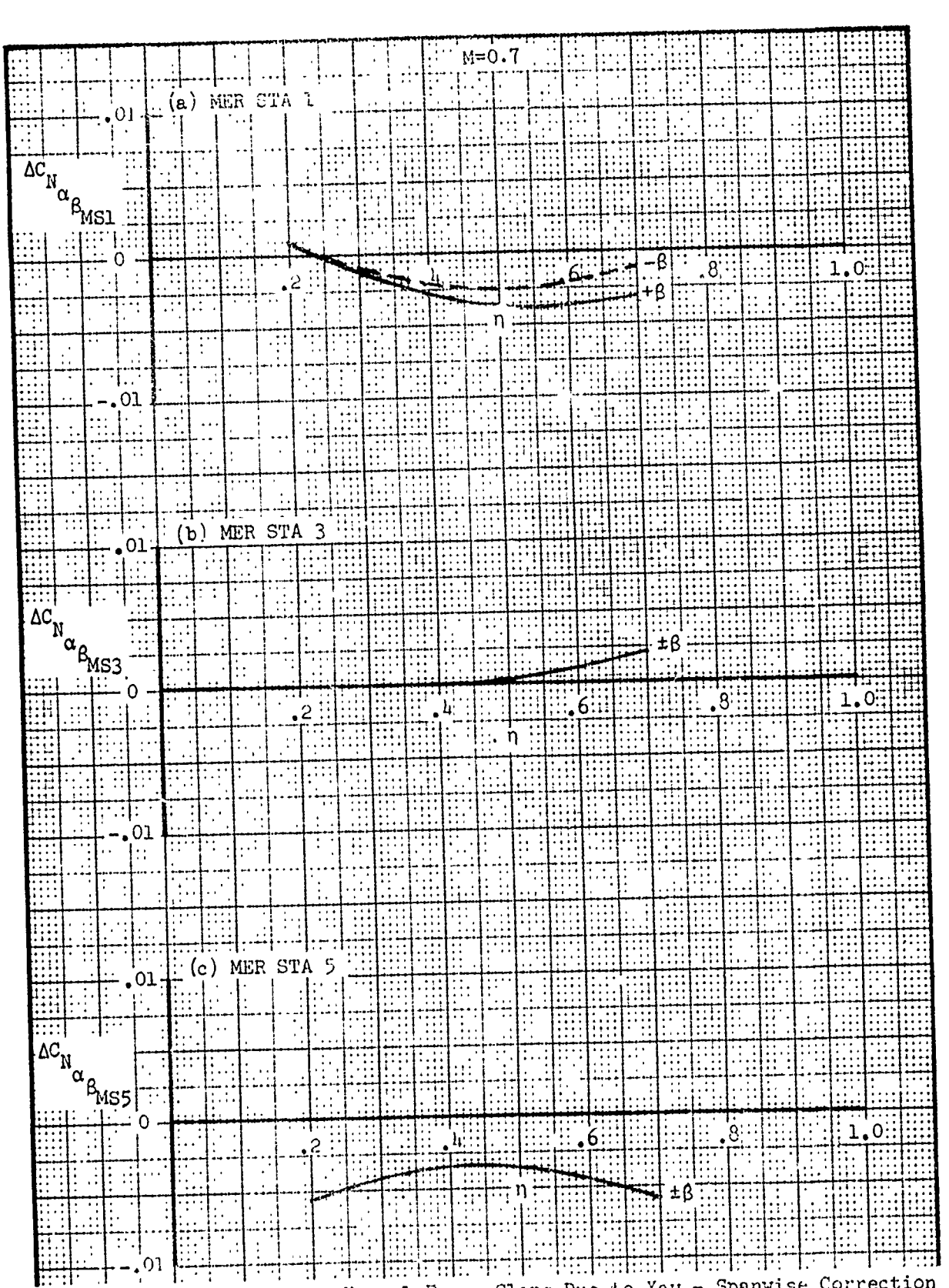


Figure 593. Incremental Normal Force Slope Due to Yaw - Spanwise Correction at M=0.7 for MER Stations 1,3 and 5

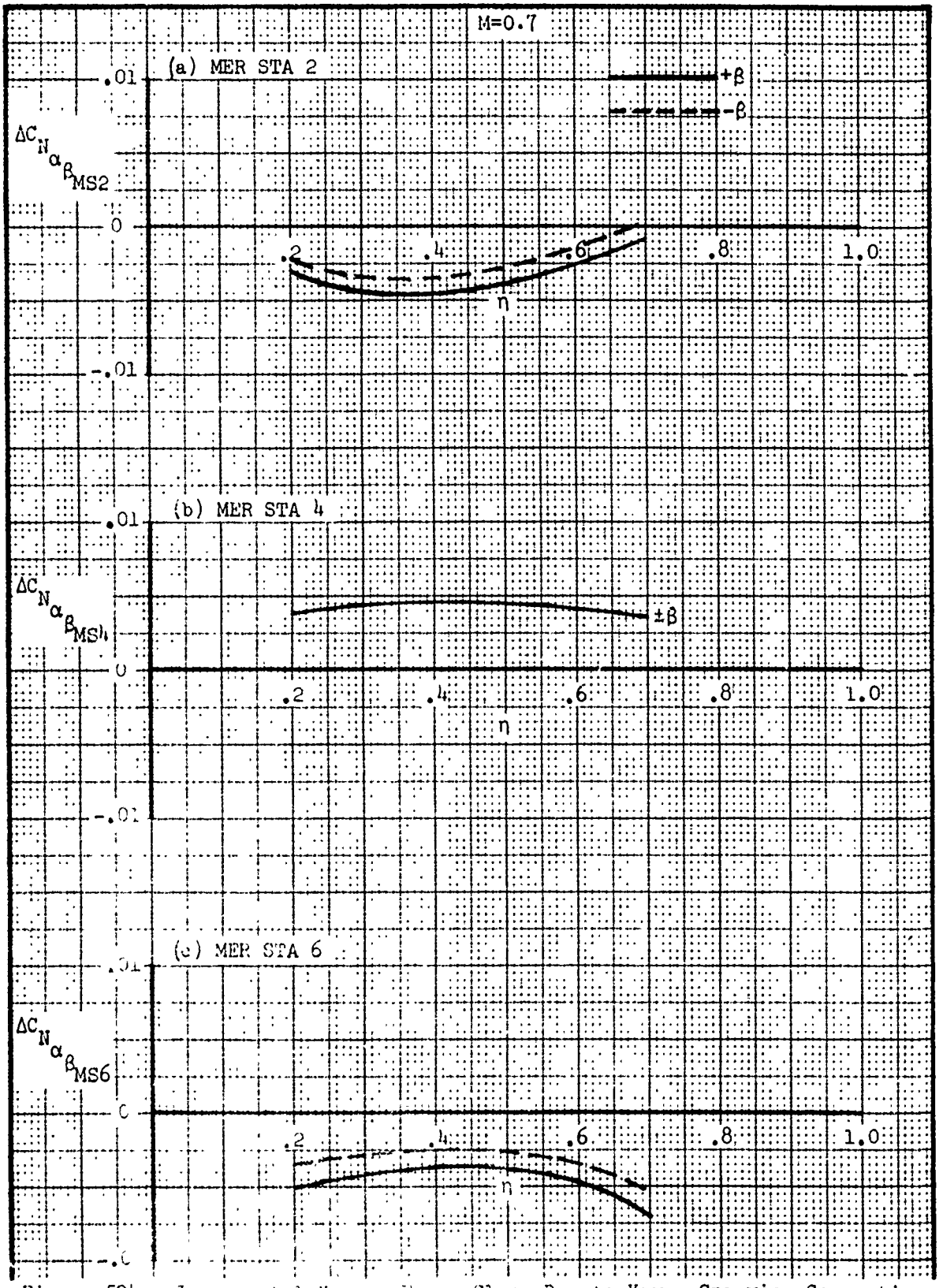


Figure 594. Incremental Normal Force Slope Due to Yaw - Spanwise Correction at M=0.7 for MER Stations 2, 4, and 6

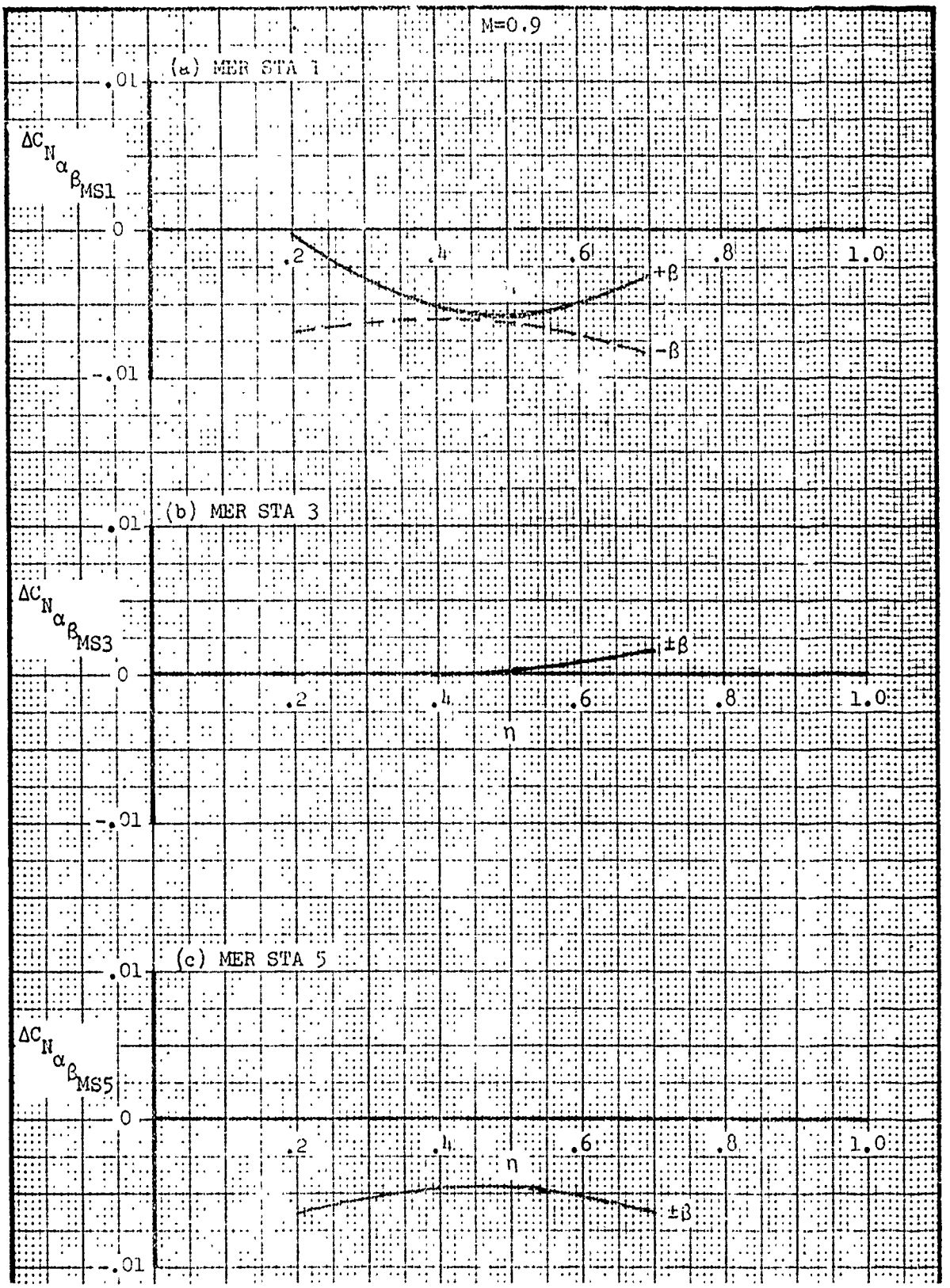


Figure 595. Incremental Normal Force Slope Due to Yaw - Spanwise Correction at M=0.9 for MER Stations 1,3, and 5

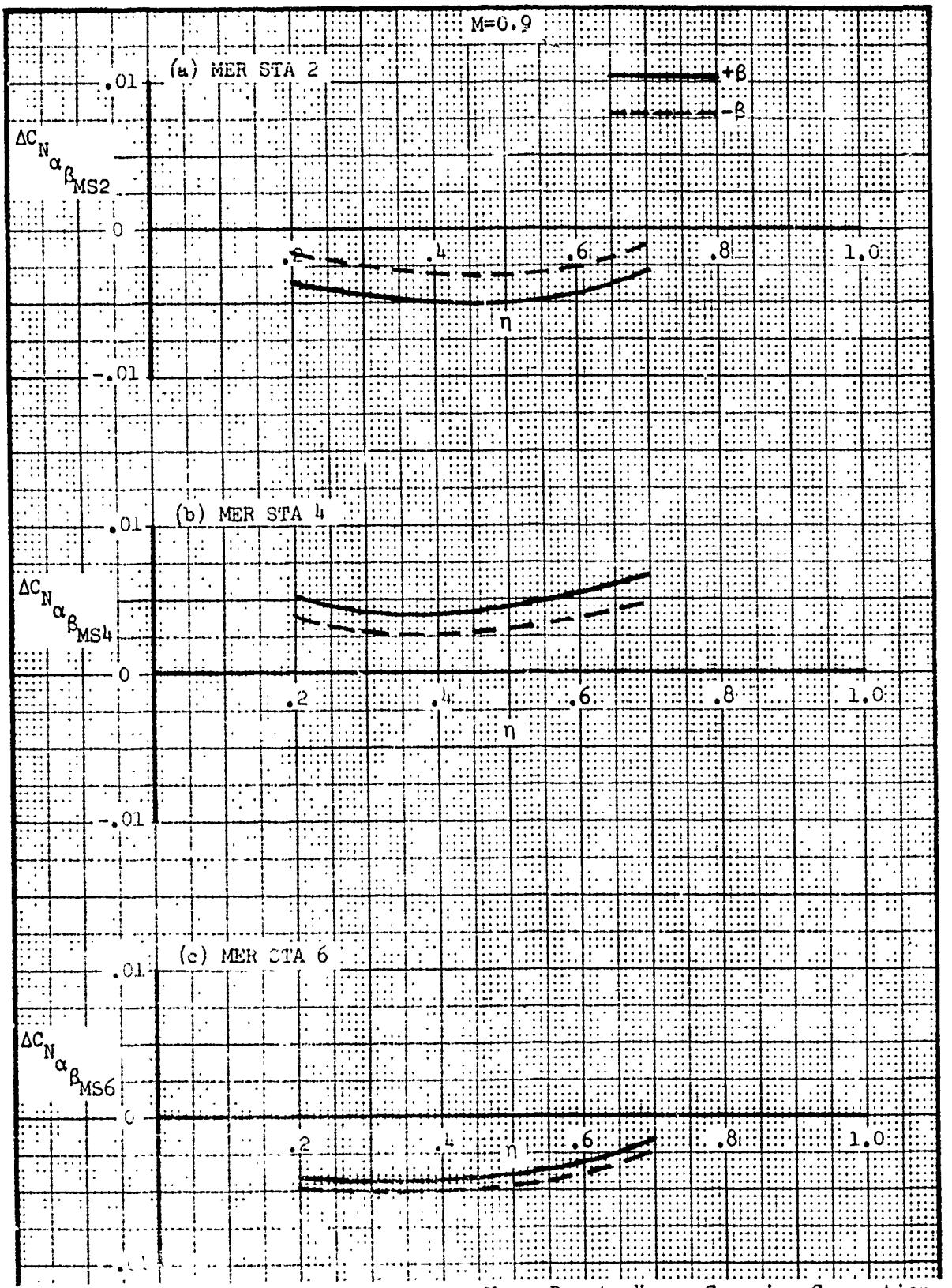


Figure 596. Incremental Normal Force Slope Due to Yaw - Spanwise Correction at M=0.9 for MER Stations 2,4, and 6

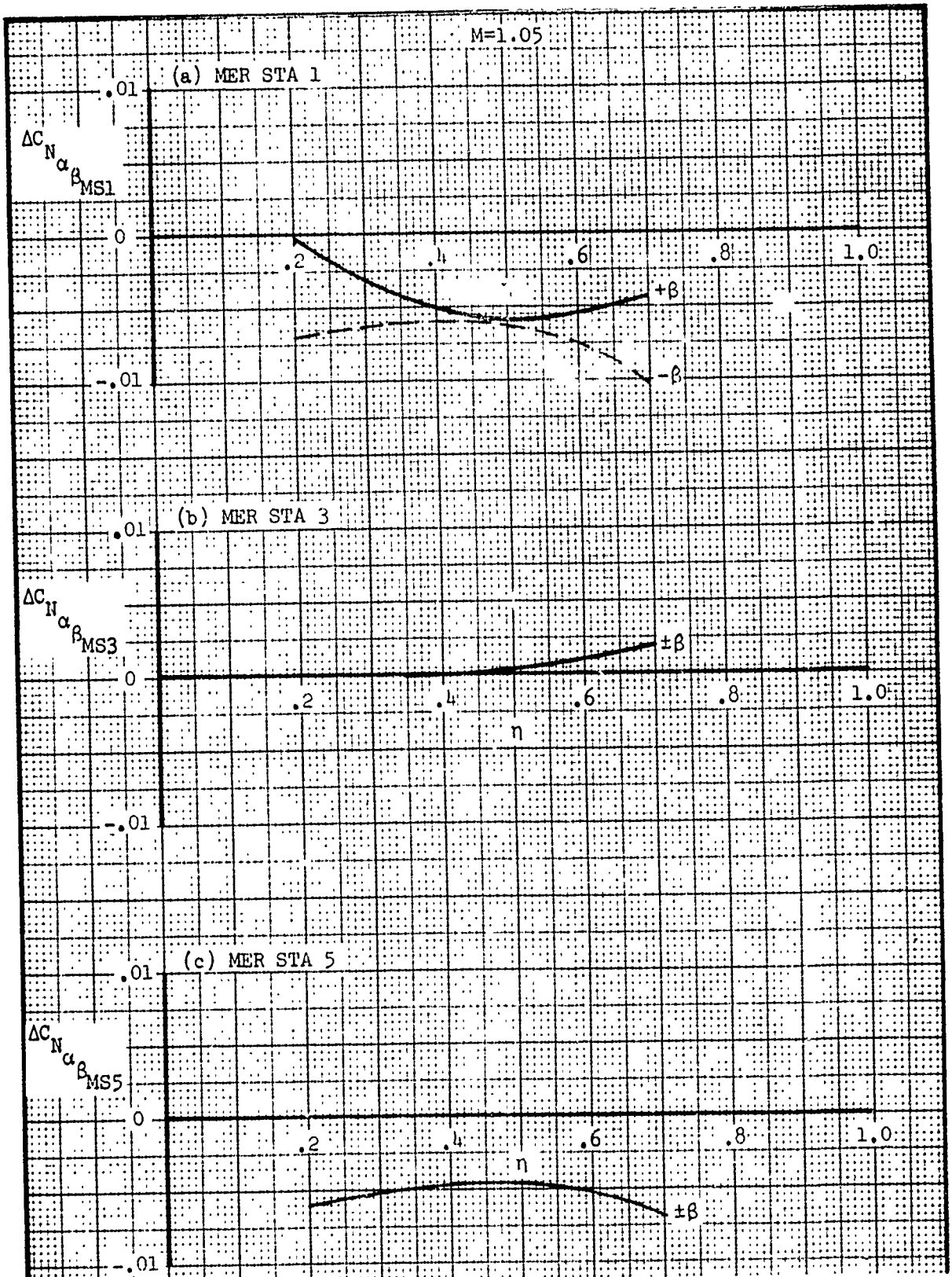


Figure 597. Incremental Normal Force Slope Due to Yaw - Spanwise Correction at M=1.05 for MER Stations 1,3 and 5

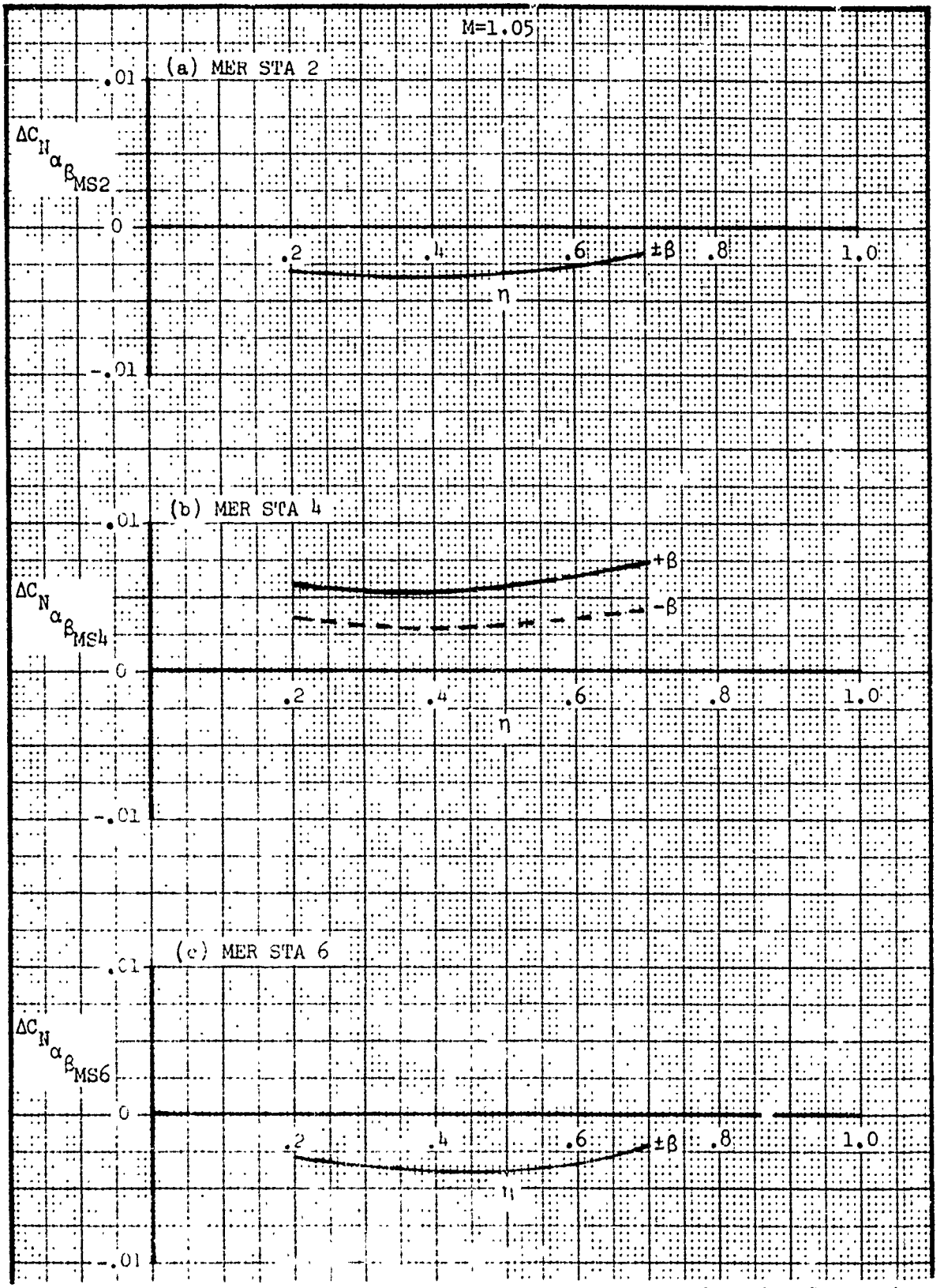


Figure 598. Incremental Normal Force Slope Due to Yaw - Spanwise Correction at M=1.05 for MER Stations 2,4 and 6

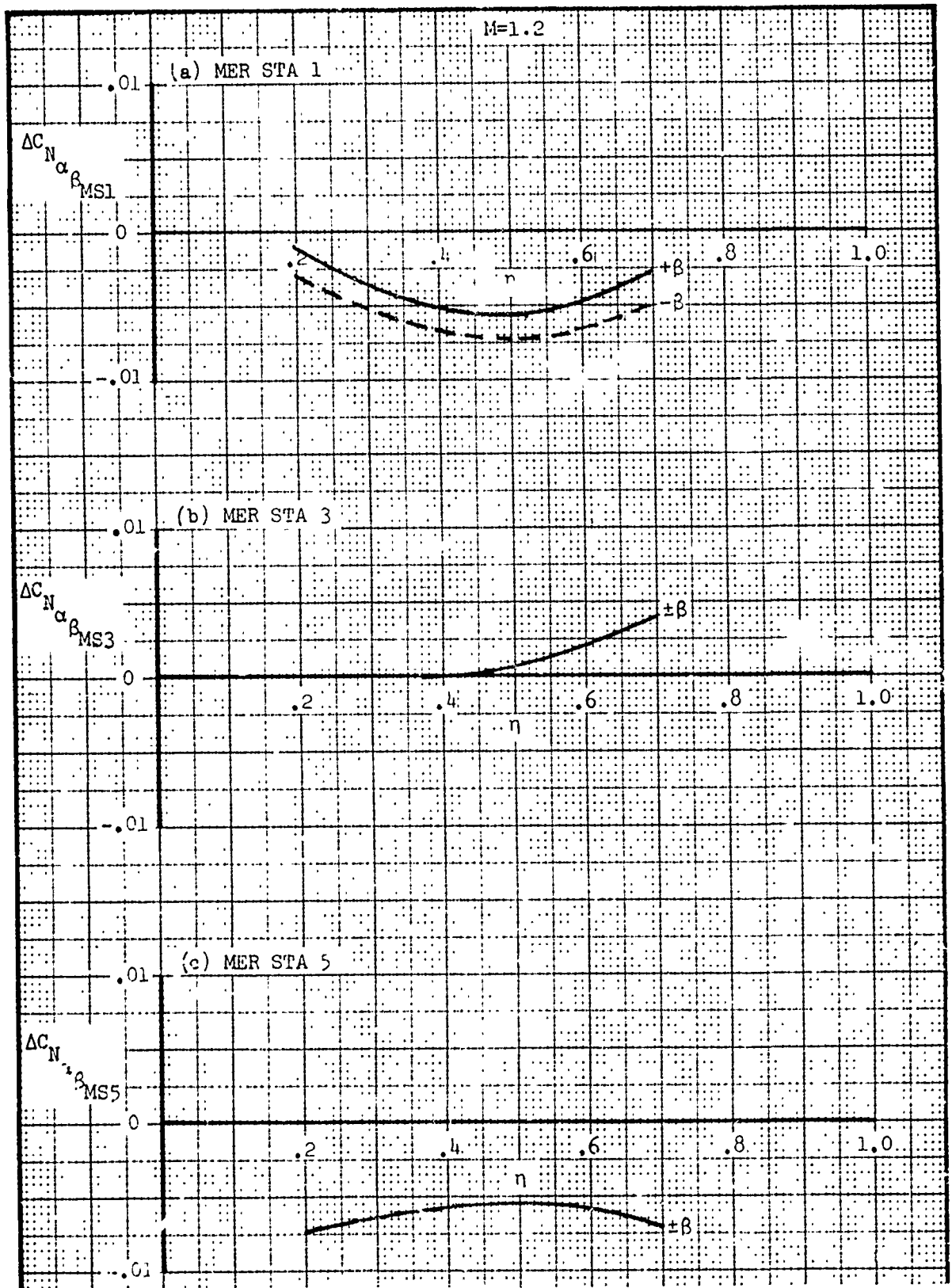


Figure 599. Incremental Normal Force Slope Due to Yaw - Spanwise Correction at M=1.2 for MER Stations 1,3 and 5

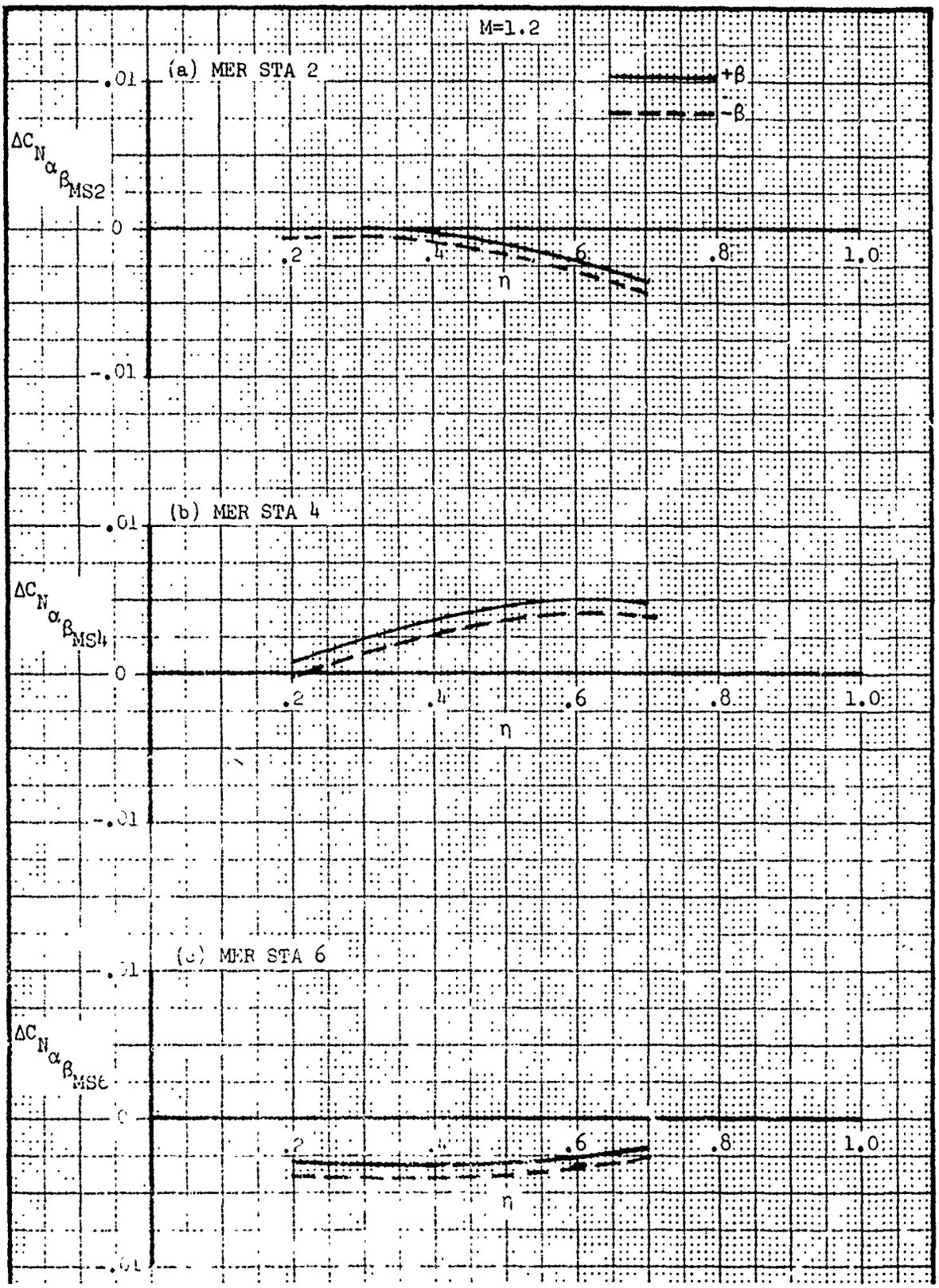


Figure 60. Incremental Normal Force Slope Due to Yaw - Spanwise Correction at M=1.2 for MER Stations 2, 4 and 6

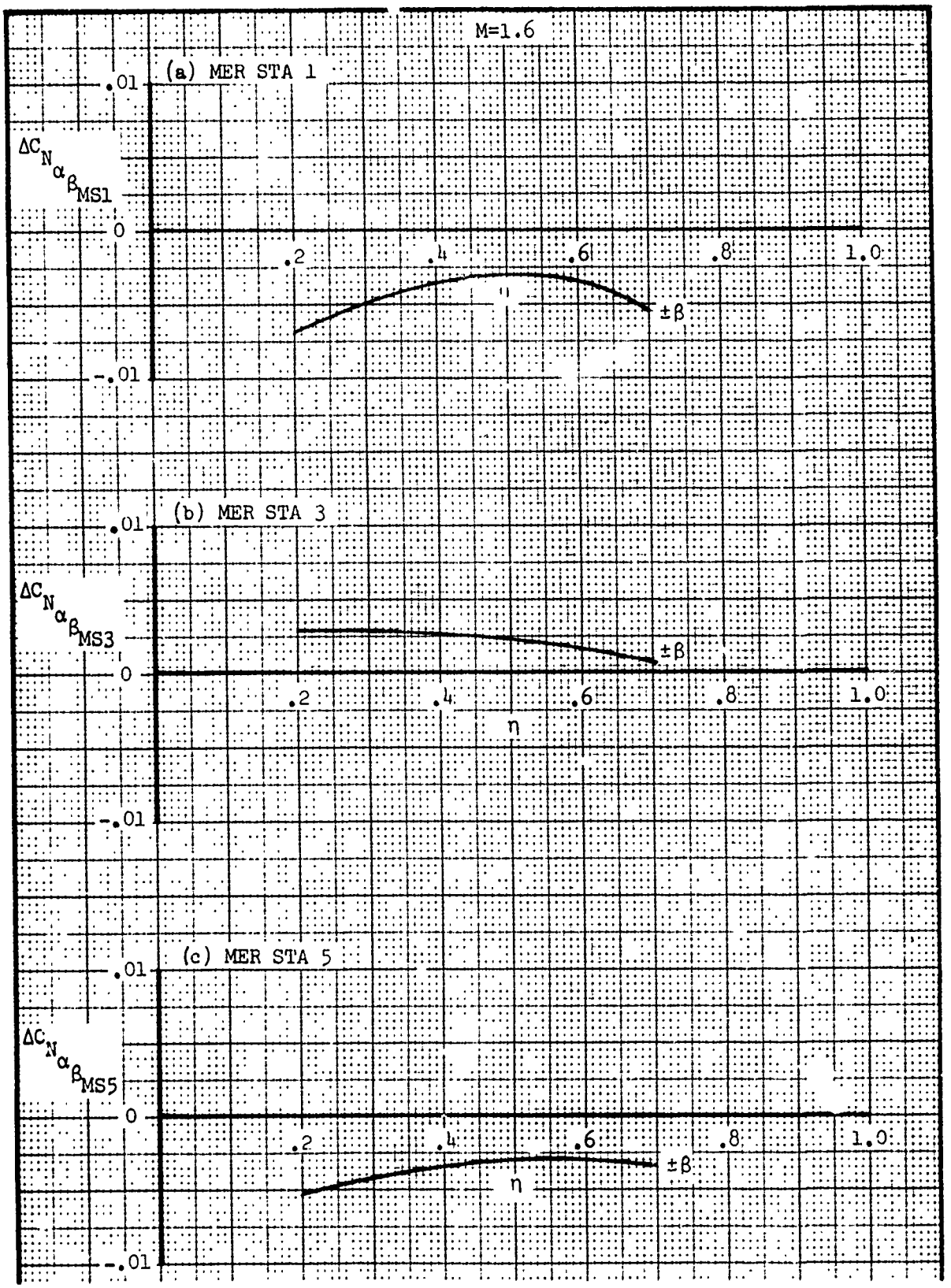


Figure 601. Incremental Normal Force Slope Due to Yaw - Spanwise Correction at M=1.6 for MER Stations 1,3 and 5

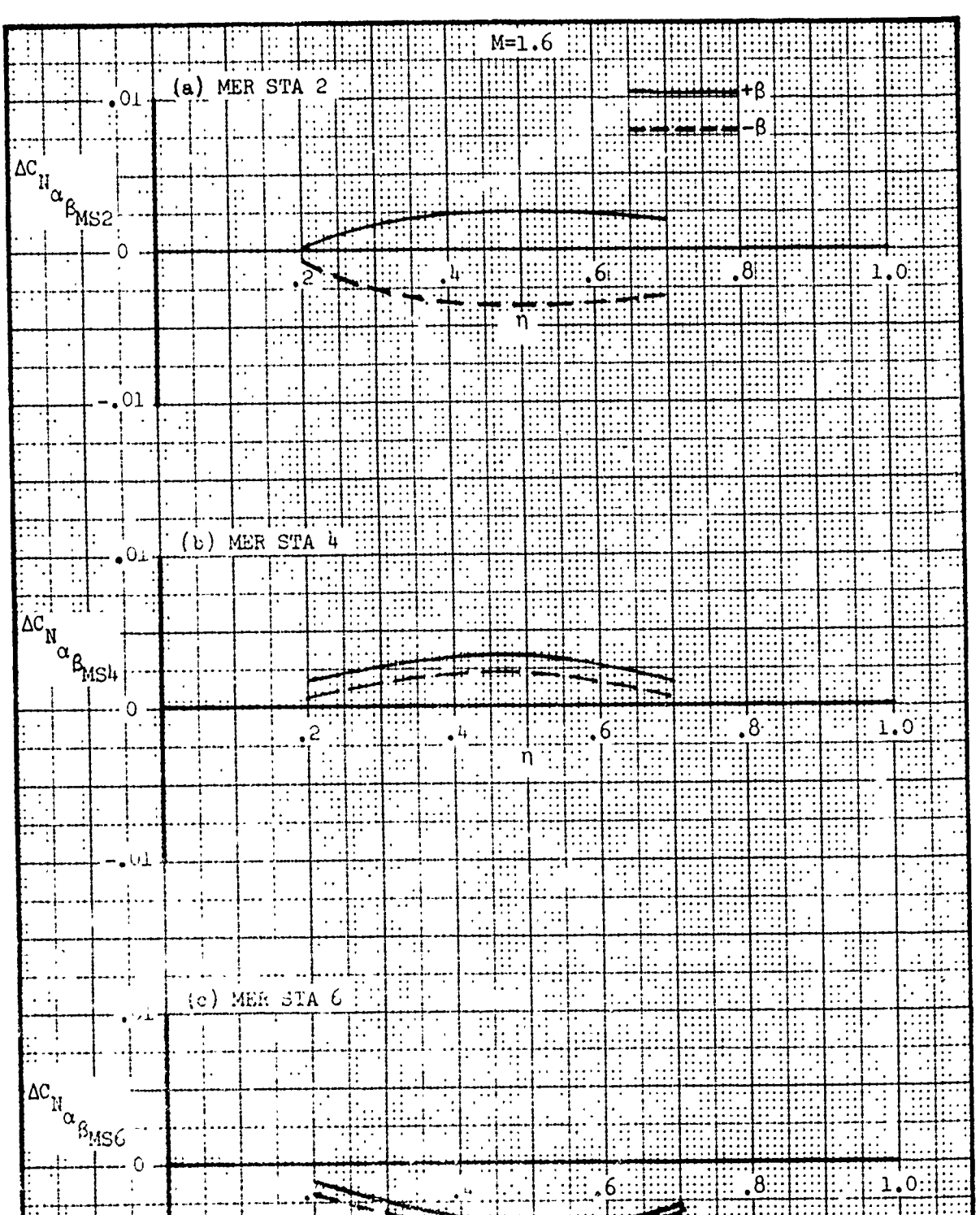


Figure 60. Incremental Normal Force Slope Due to Yaw - Spanwise Correction at M=1.6 for MER Stations 2, 4 and 6

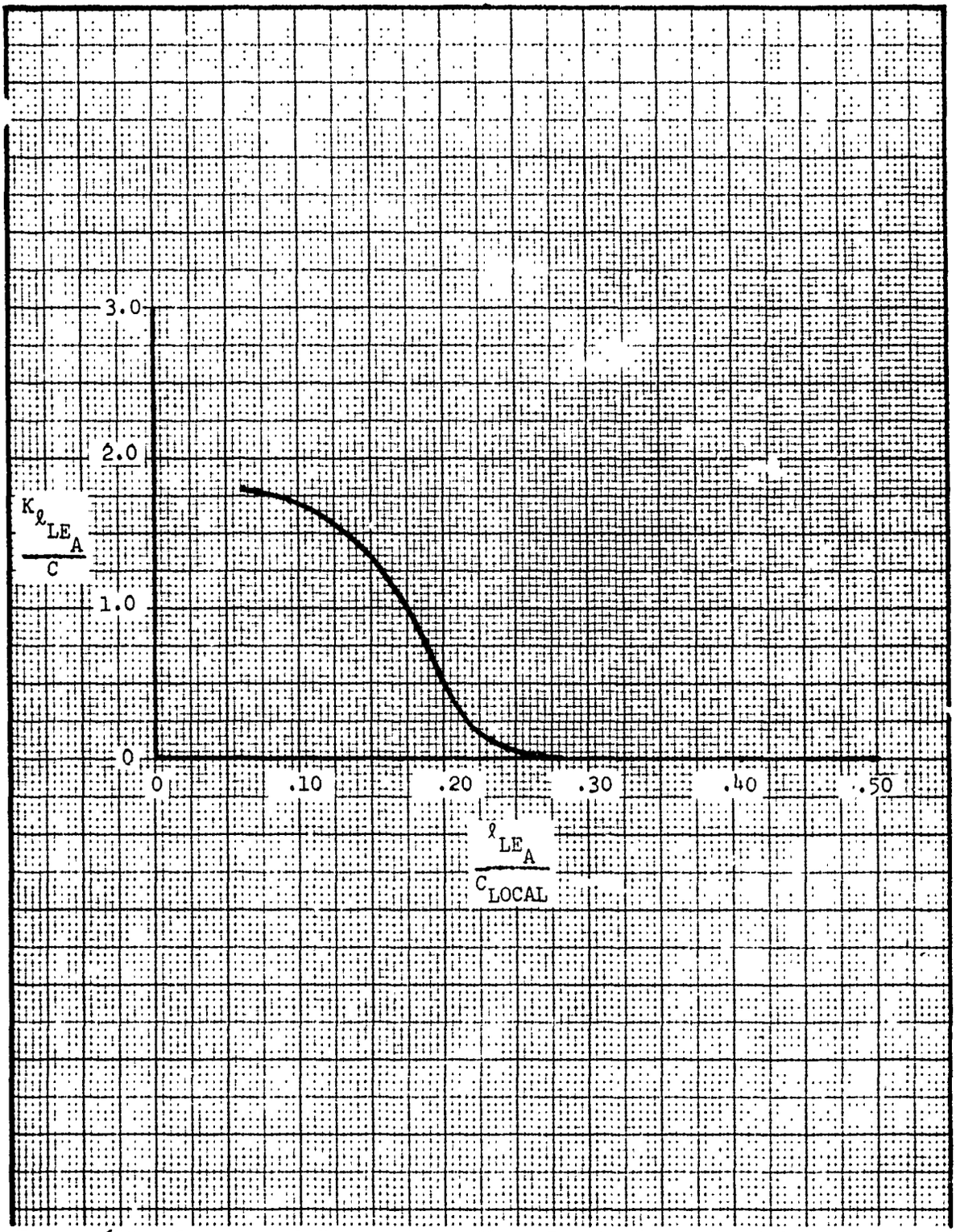


Figure 603. Incremental Normal Force Slope Due to Yaw - Chordwise Correction Factor

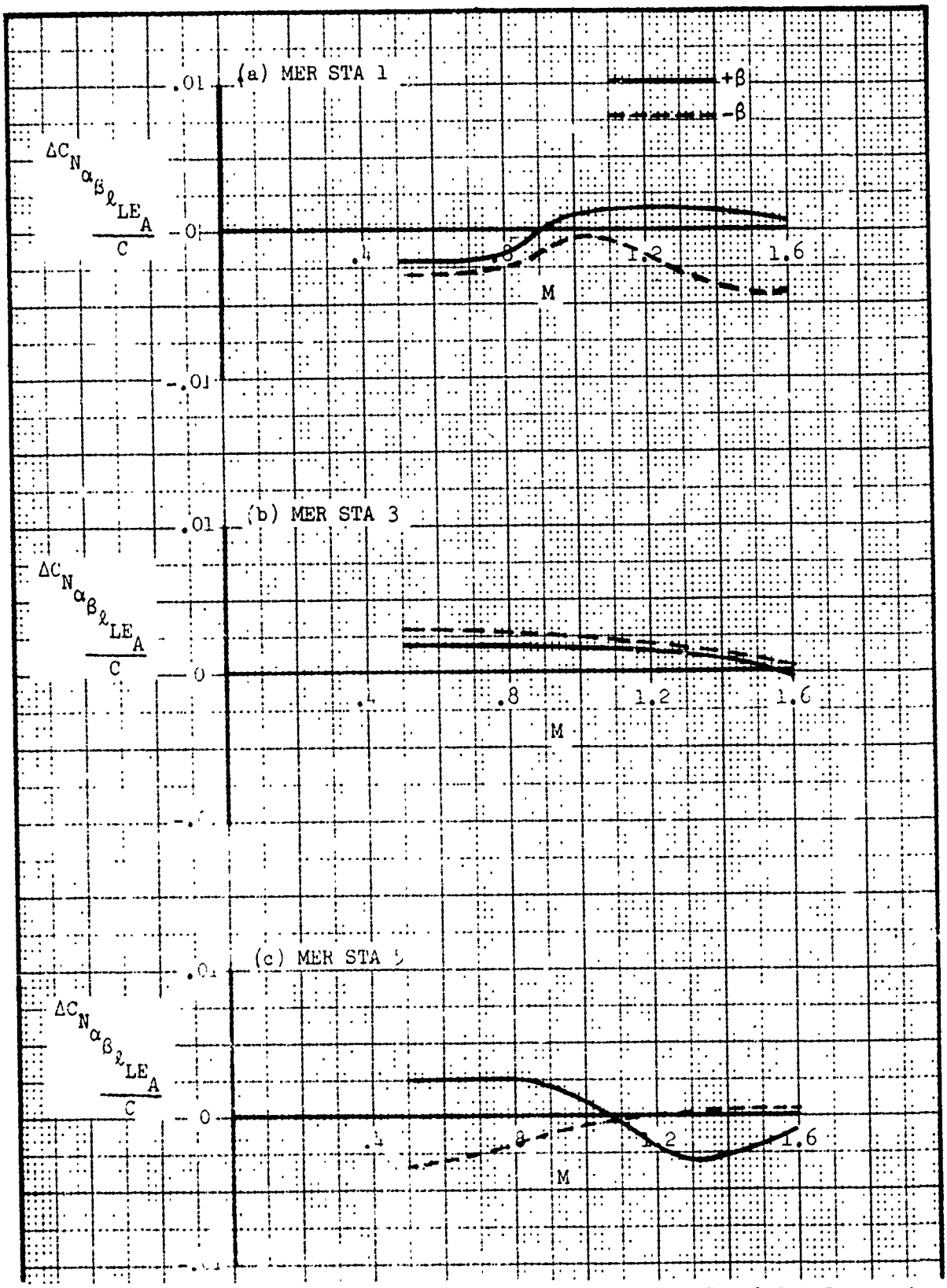


Figure 60a. Incremental Normal Force Slope Due to Yaw - Chordwise Correction for MER Stations 1, 3 and 5

4.3.2.2 Intercept Prediction

The incremental normal force intercept prediction is divided into two sections, fuselage centerline-mounted stores and wing-mounted stores. The technique presented in this section covers the Mach number range 0.5 to 1.6.

FUSELAGE CENTERLINE-MOUNTED STORES

MER STATIONS 1-6 (MS1-6):

$$\Delta\left(\frac{NF}{q}\right)_{\alpha=0_{\beta_{\ell}}} = \left(\Delta C_{N_{\alpha=0_{\beta_{\ell}}}}\right)_{MS1-6} K_{SCALE_{NF}}$$

where:

$\Delta C_{N_{\alpha=0_{\beta_{\ell}}}}$ - Incremental $C_{N_{\alpha=0_{\beta}}}$ presented as a function of Mach number, $\frac{1}{deg^2}$.

MER STA 1 - Figure 605
MER STA 2 - Figure 606
MER STA 3 - Figure 605
MER STA 4 - Figure 606
MER STA 5 - Figure 605
MER STA 6 - Figure 606

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

WING-MOUNTED STORES

MER STATIONS 1,3, and 5 (MS1,3,5):

$$\Delta\left(\frac{NF}{q}\right)_{\alpha=0_{\beta}} = \left(\Delta C_{N_{\alpha=0_{\beta}}} + K_{\ell_{\frac{LE_A}{C}}} \Delta C_{N_{\alpha=0_{\beta_{\ell_{\frac{LE_A}{C}}}}}}\right)_{MS1,3,5} K_{SCALE_{NF}}$$

where:

$\Delta C_{N_{\alpha=0_\beta}}$ - Incremental $C_{N_{\alpha=0}}$ per degree β presented as a function of wing spanwise position for Mach numbers 0.7, 0.9, 1.05, 1.2, and 1.6, $\frac{1}{deg}$, Table 16.

$K_{\frac{\ell_{LE_A}}{C}}$ - Proportioning factor based on the distance from the wing leading edge to the nose of the store on MER STATION 1 measured in the wing plan view divided by the local wing chord, positive, Figure 603, Subsection 4.3.2.1.

$\Delta C_{N_{\alpha=0_{\beta_{\frac{\ell_{LE_A}}{C}}}}}$ - Incremental $C_{N_{\alpha=0}}$ per degree β based on ℓ_{LE_A}/C defined above and presented as a function of Mach number, $\frac{1}{deg}$.

MER STA 1 - Figure 617
MER STA 3 - Figure 617
MER STA 5 - Figure 617

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

MER STATIONS 2,4, and 6 (MS2,4,6):

$$\Delta\left(\frac{NF}{q}\right)_{\alpha=0_{\beta_{MS2,4,6}}} = \left(\Delta C_{N_{\alpha=0_{\beta_{MS2,4,6}}}}\right) K_{SCALE_{NF}}$$

where:

$\Delta C_{N_{\alpha=0_\beta}}$ - Incremental $C_{N_{\alpha=0}}$ per degree β presented as a function of wing spanwise position for Mach numbers 0.7, 0.9, 1.05, 1.2, and 1.6, $\frac{1}{deg}$, Table 16.

$K_{SCALE_{NF}}$ - Defined in Section IV, ft^2.

The variation of $\Delta C_{N_{\alpha=0_\beta}}$ for MER STATIONS 1-6 is presented at distinct Mach numbers of 0.7, 0.9, 1.05, 1.2, and 1.6. Table 16 presented below is a guide for locating the curves for $\Delta C_{N_{\alpha=0_\beta}}$ for each MER station at the Mach numbers indicated above. For Mach numbers between 0.5 and 0.7, the value at M = 0.7 should be used in the computation. For Mach numbers between 0.7 and 1.6 other than those distinctly presented, linear interpolation should be used between the appropriate Mach numbers to obtain the required value for computation.

TABLE 16. INCREMENTAL NORMAL FORCE INTERCEPT COEFFICIENT DUE TO YAW - FIGURE LOCATION GUIDE

$\Delta C_{N_{\alpha=0_\beta}}$	MACH NUMBER				
	0.7	0.9	1.05	1.2	1.6
	Figure Number				
MER STA 1	607	609	611	613	615
MER STA 2	608	610	612	614	616
MER STA 3	607	609	611	613	615
MER STA 4	608	610	612	614	616
MER STA 5	607	609	611	613	615
MER STA 6	608	610	612	614	616

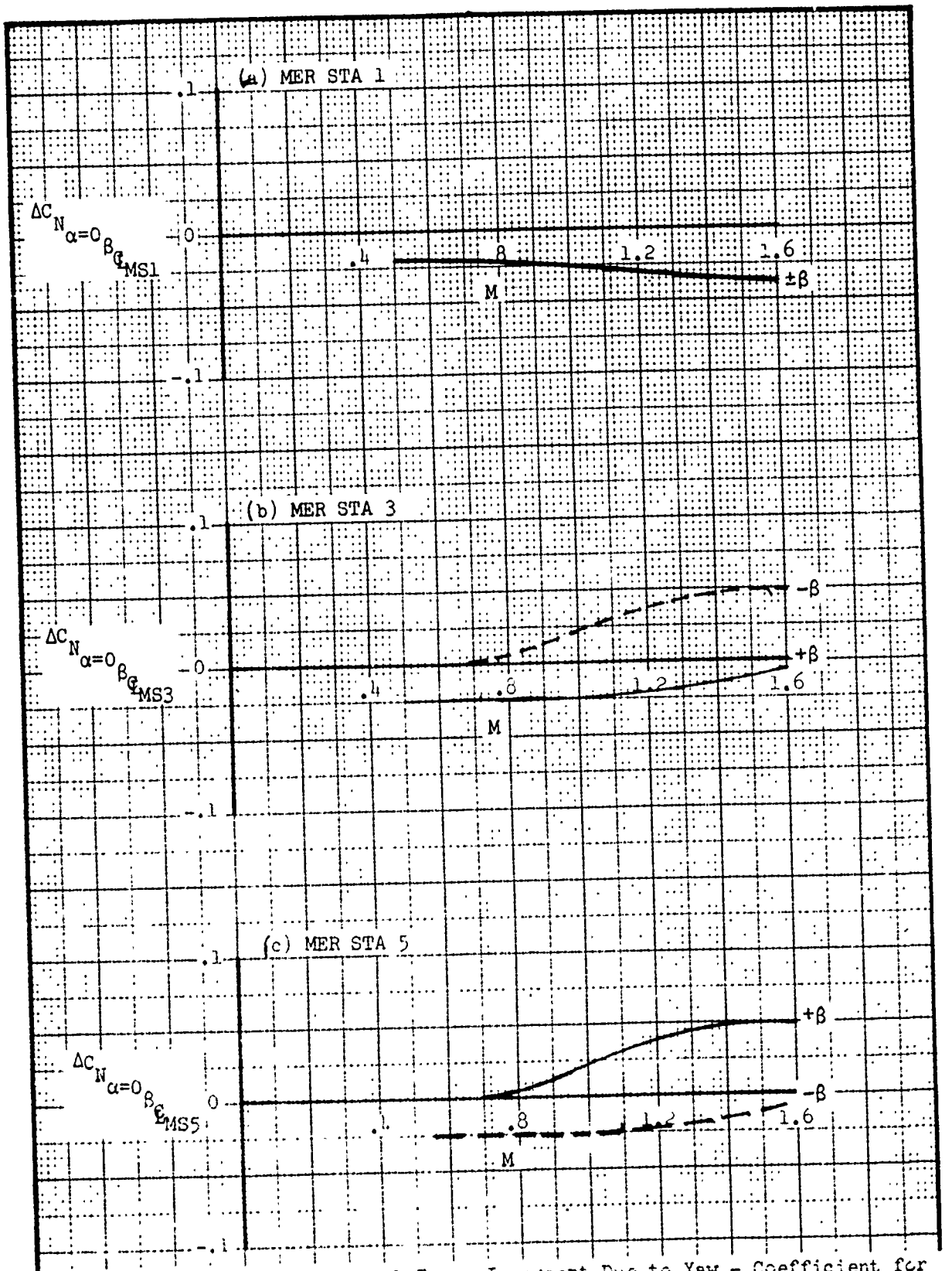


Figure 605. Incremental Normal Force Intercept Due to Yaw - Coefficient for Stores Mounted on Fuselage Centerline, MER Stations 1,3 and 5

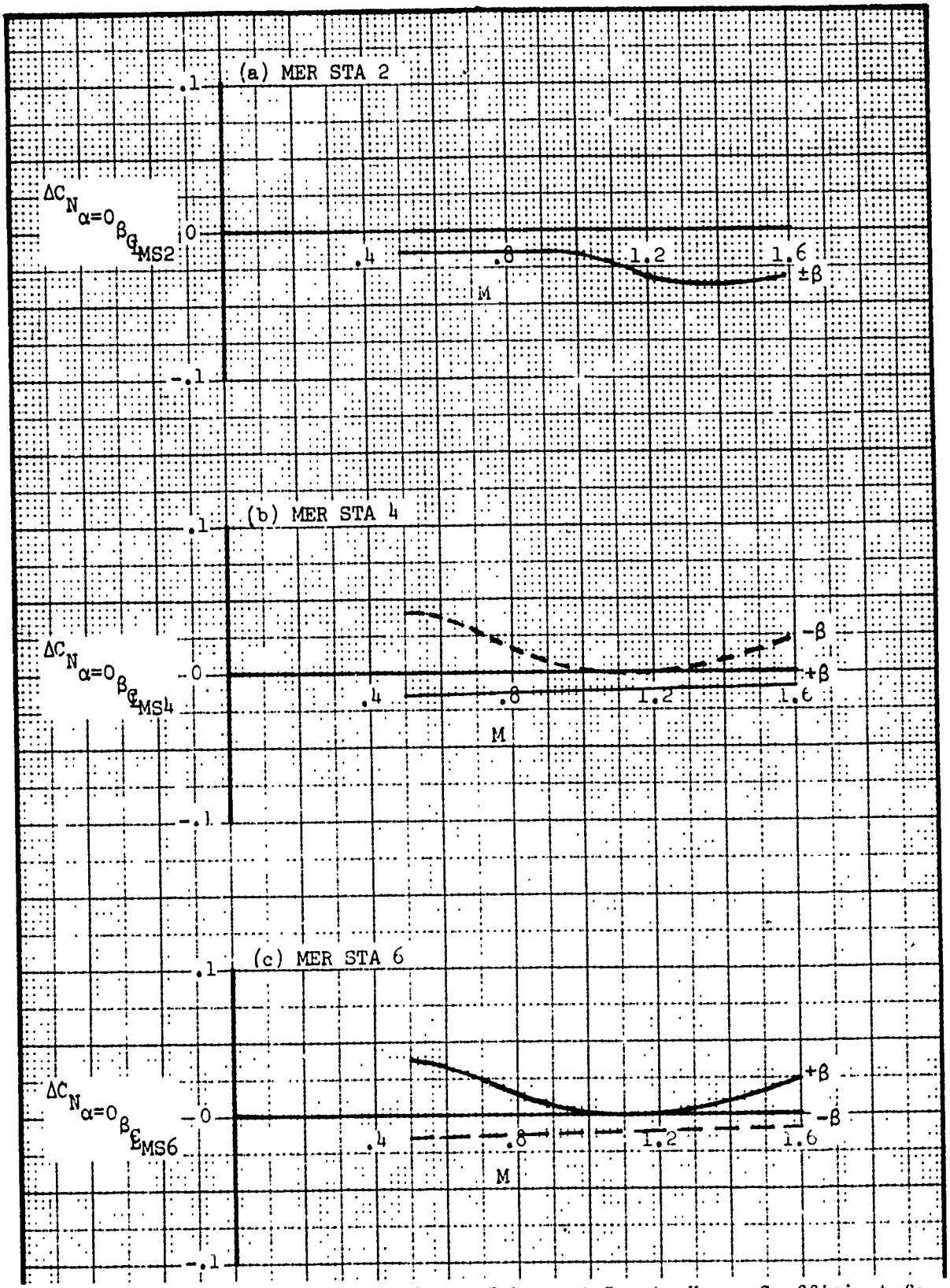


Figure 606. Incremental Normal Force Intercept Due to Yaw - Coefficient for Stores Mounted on Fuselage Centerline, MER Stations 2,4, and 6

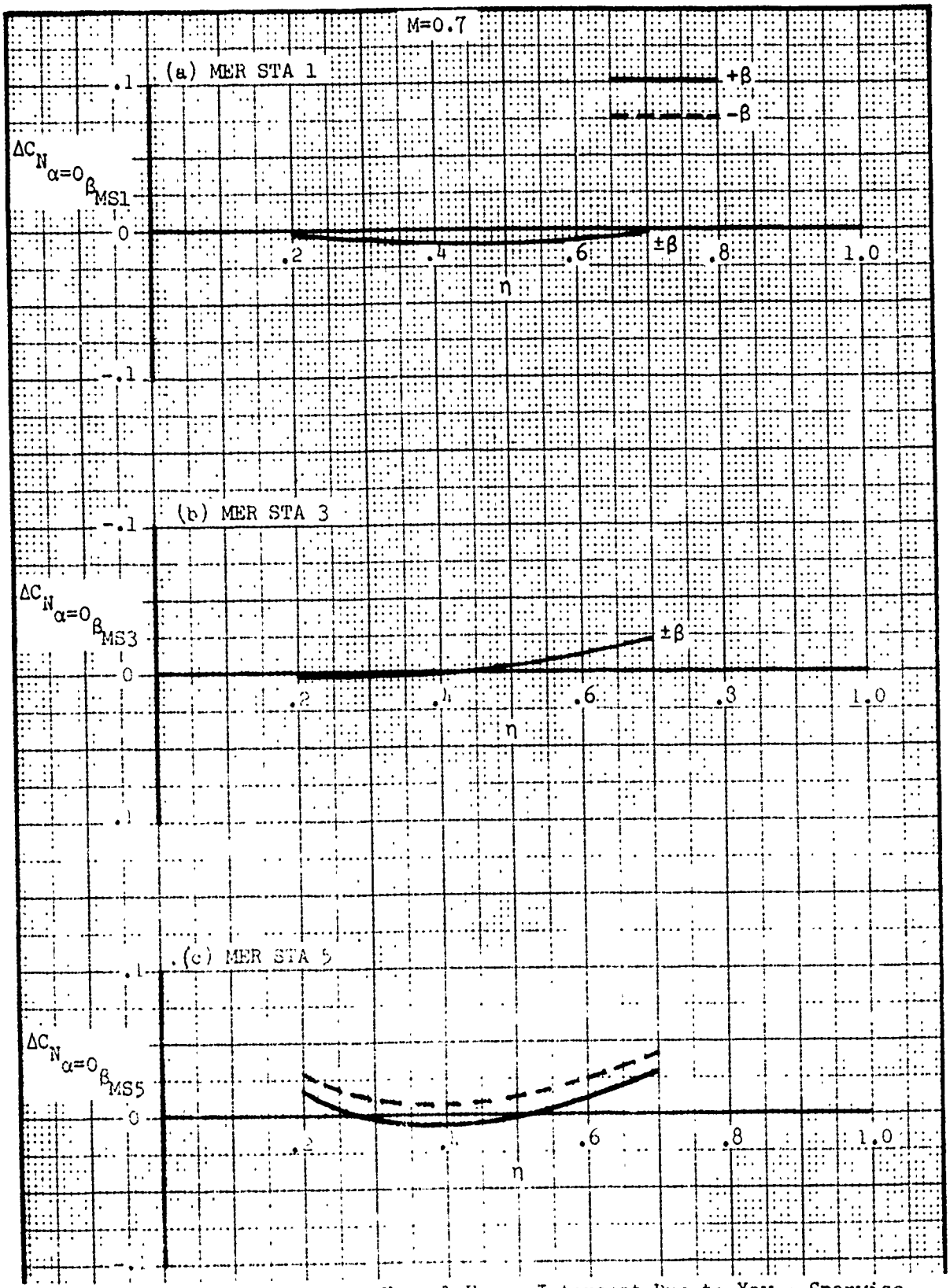


Figure 307. Incremental Normal Force Intercept Due to Yaw - Spanwise Correction at M=0.7 for MER Stations 1,3, and 5

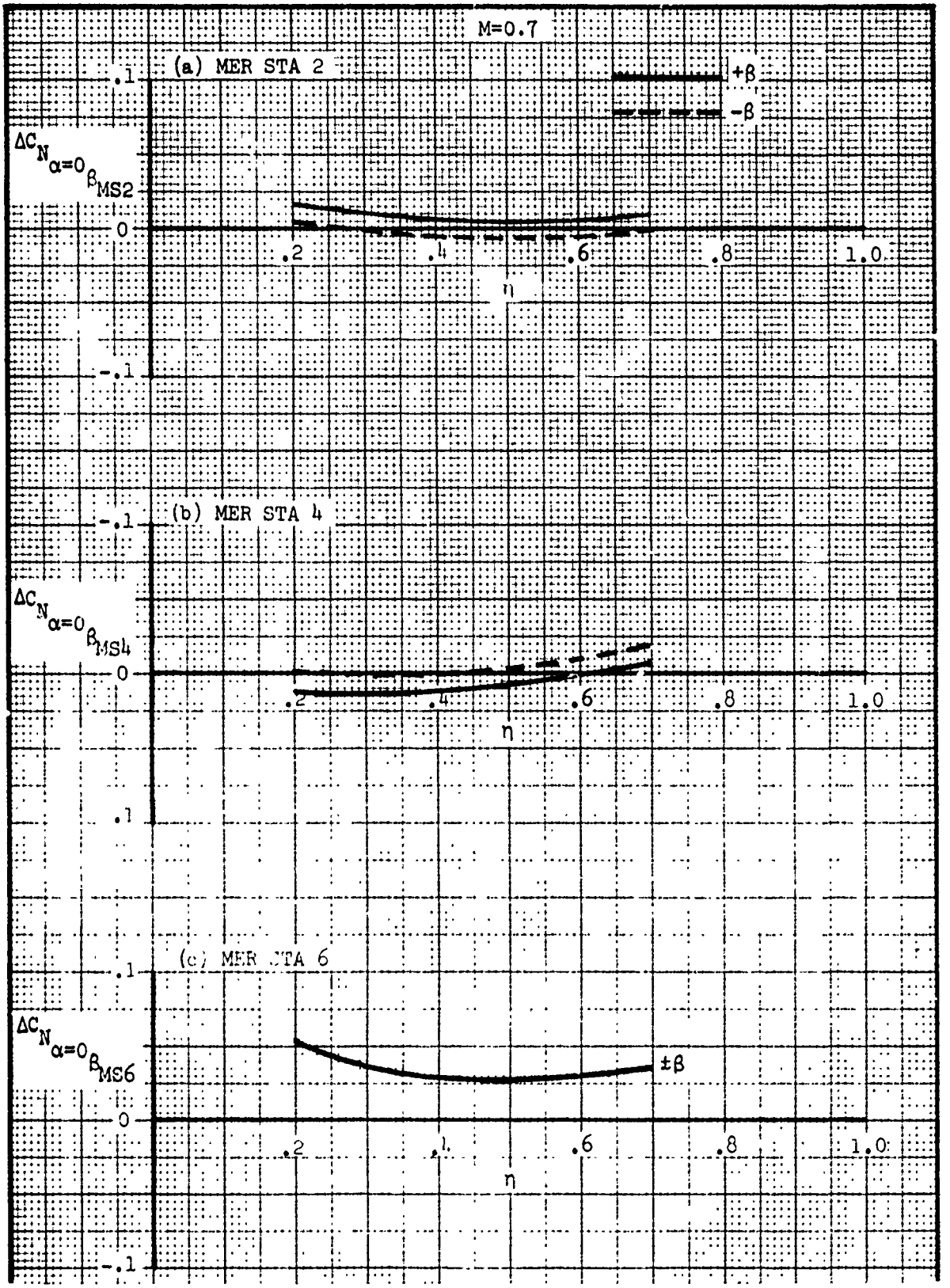


Figure 608. Incremental Normal Force Intercept Due to Yaw - Spanwise Correction at M=0.7 for MER Stations 2,4 and 6

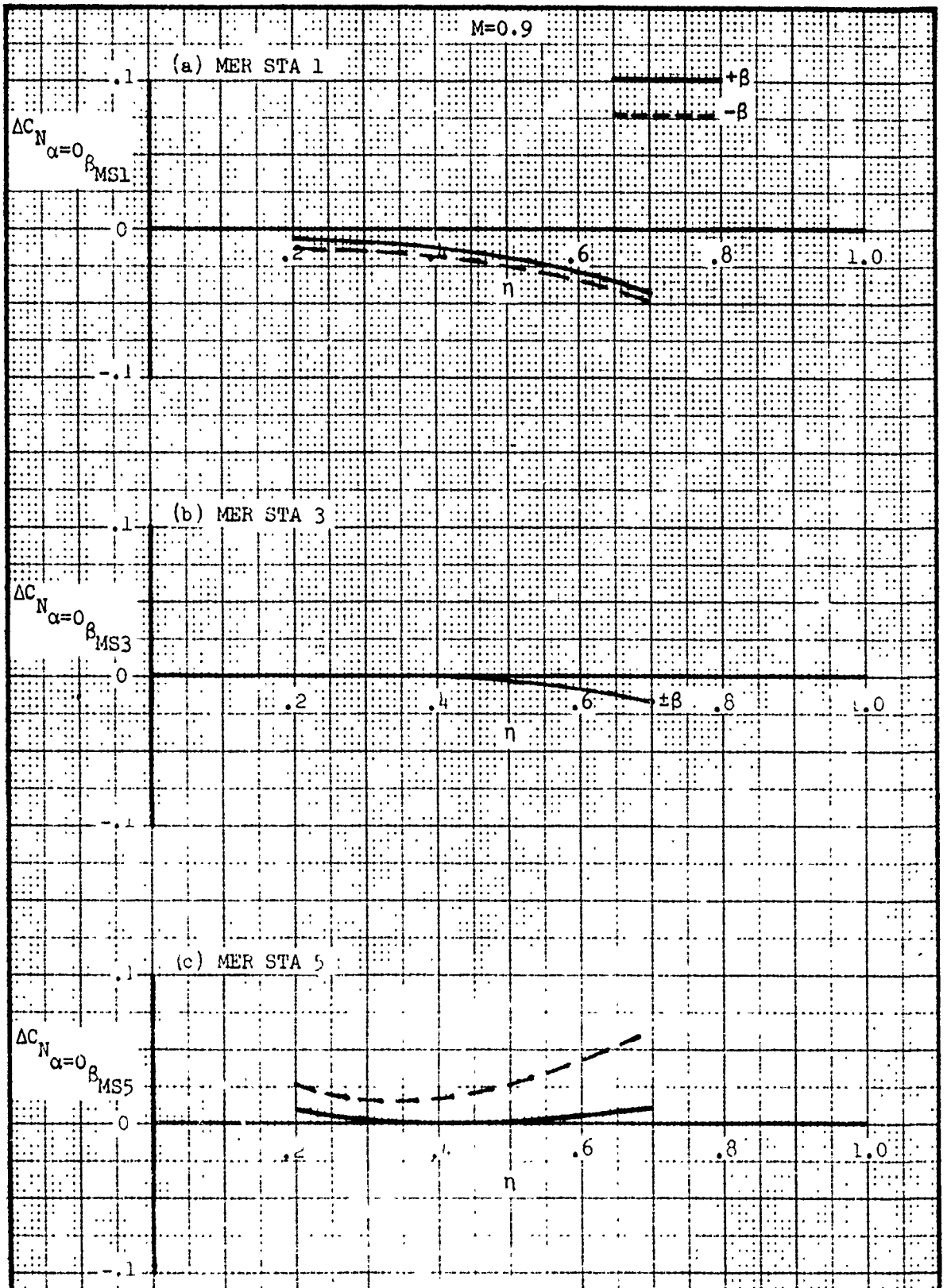


Figure 609. Incremental Normal Force Intercept Due to Yaw - Spanwise Correction at M = 0.9 for MER Stations 1,3 and 5

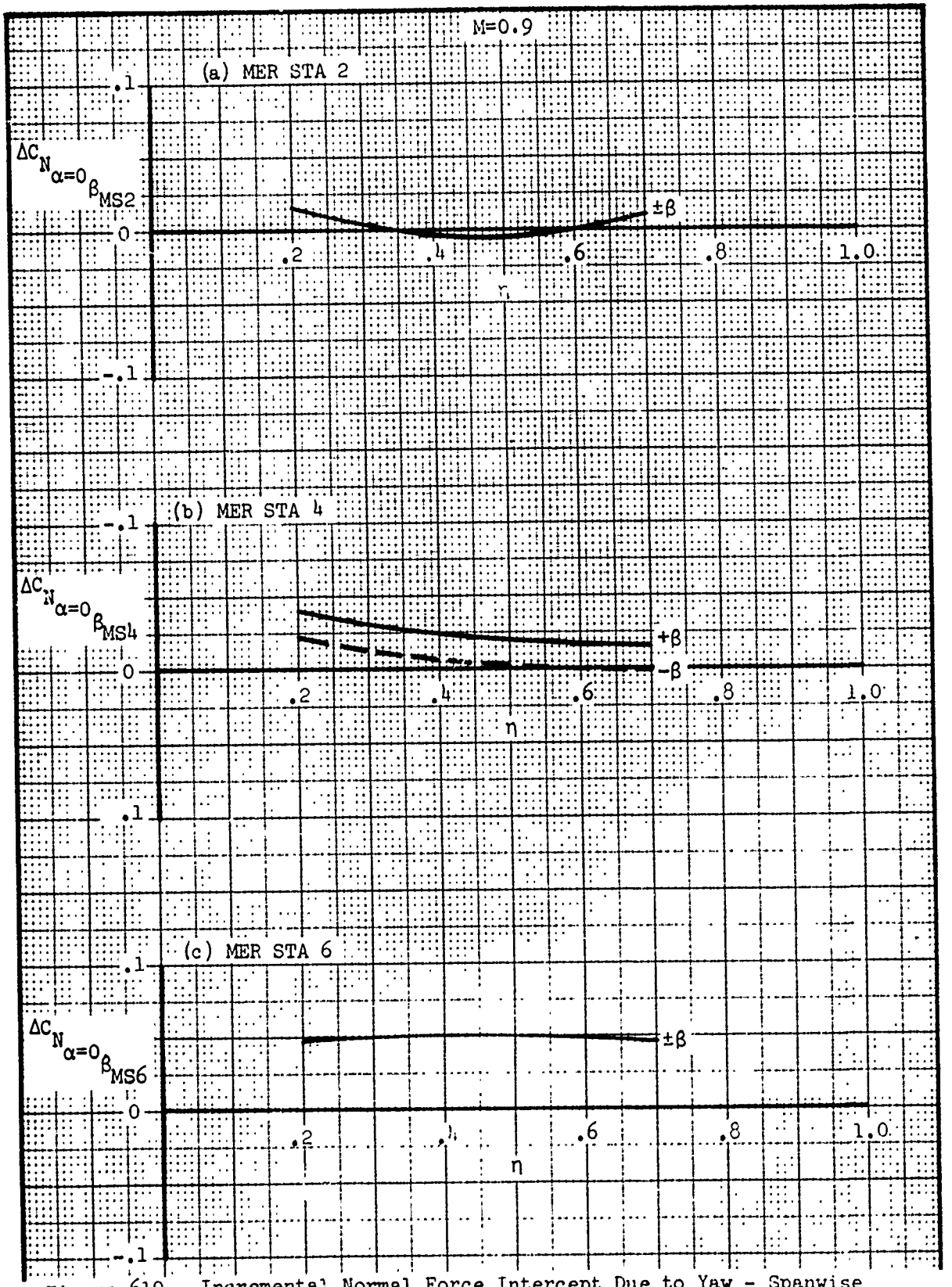


Figure 610. Incremental Normal Force Intercept Due to Yaw - Spanwise Correction at M=0.9 for MER Stations 2,4 and 6

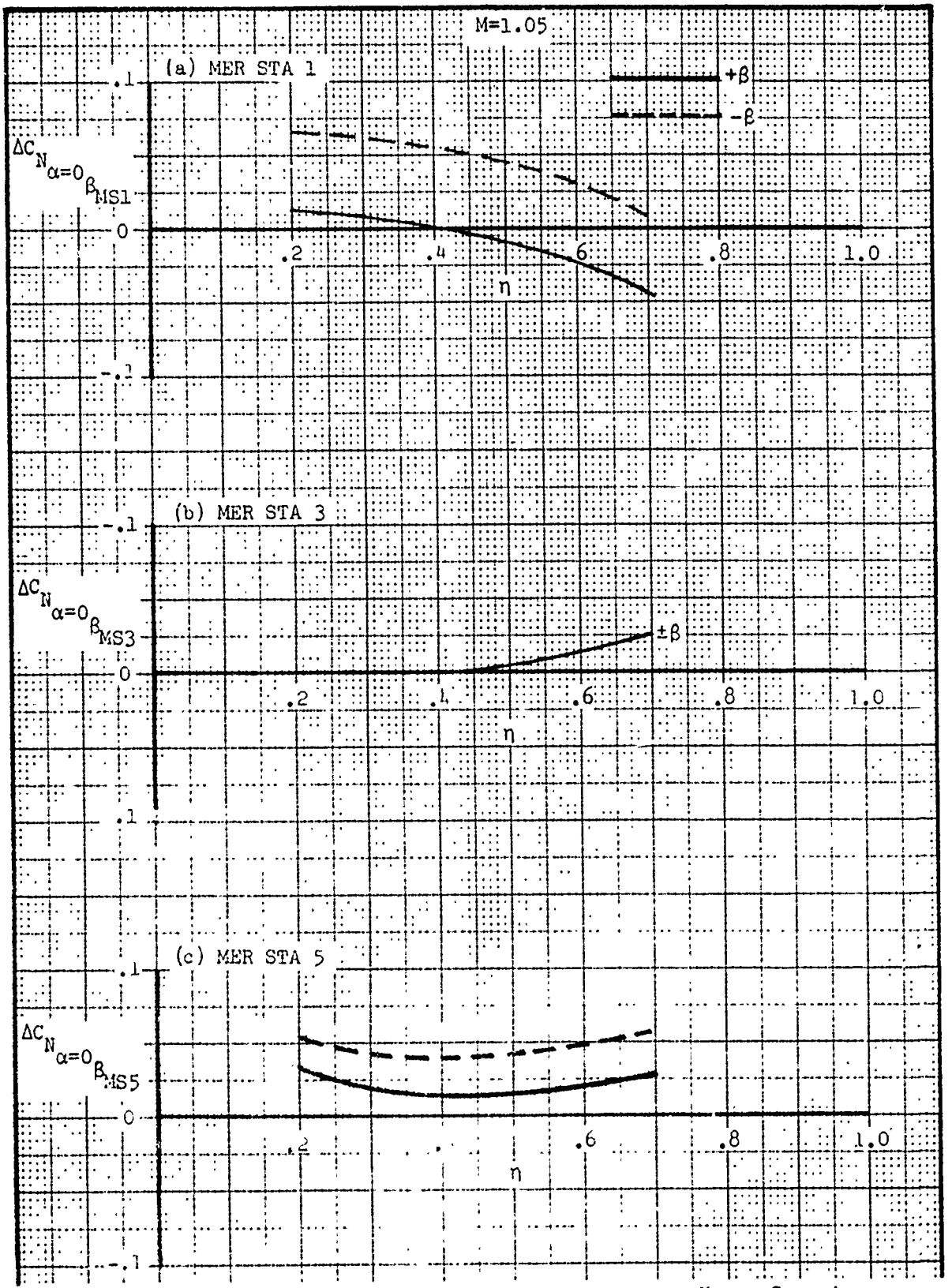


Figure 611. Incremental Normal Force Intercept Due to Yaw - Spanwise Correction at M=1.05 for MER Stations 1,3 and 5

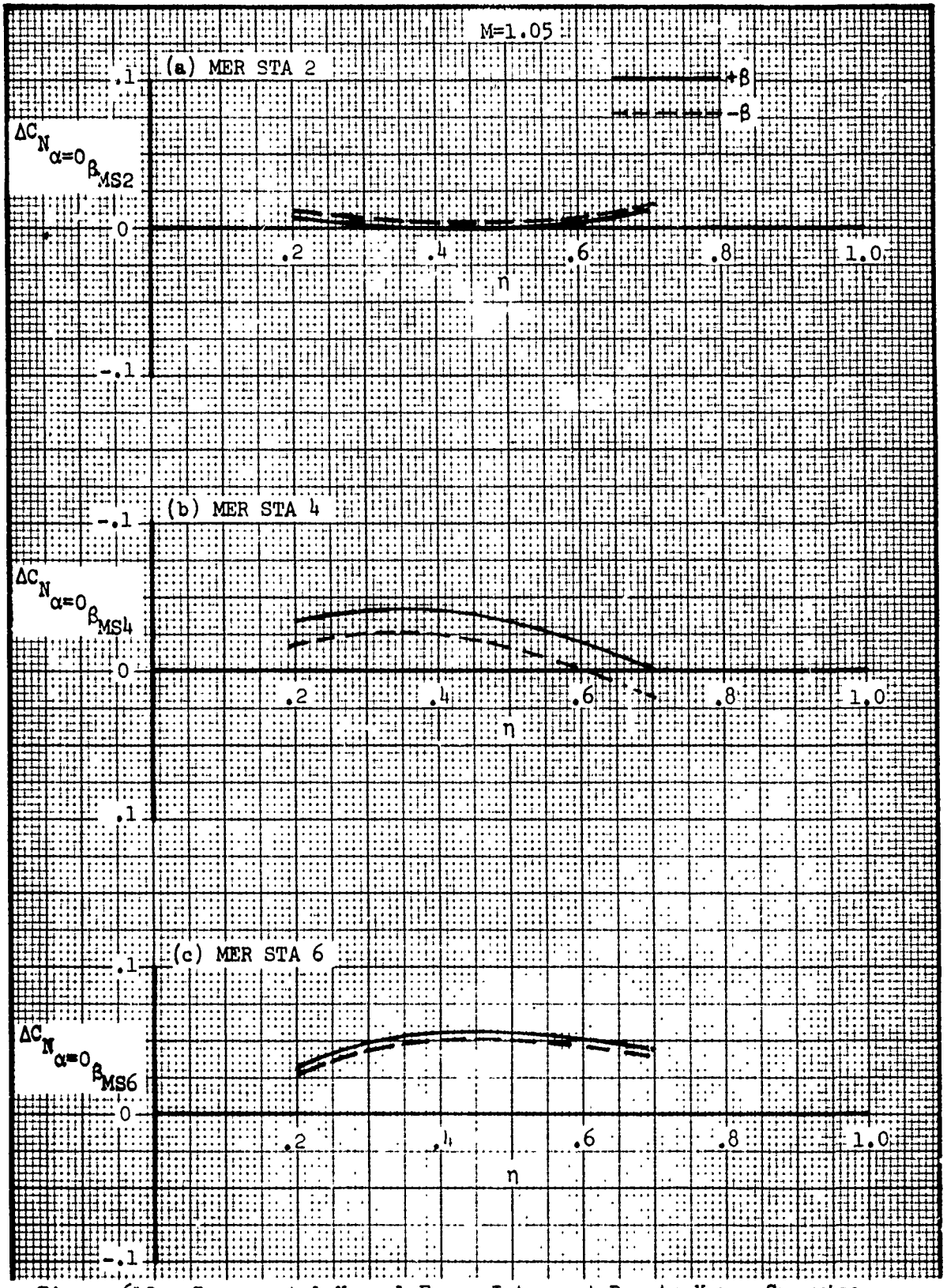


Figure 612. Incremental Normal Force Intercept Due to Yaw - Spanwise Correction at M=1.05 for MER Stations 2,4 and 6

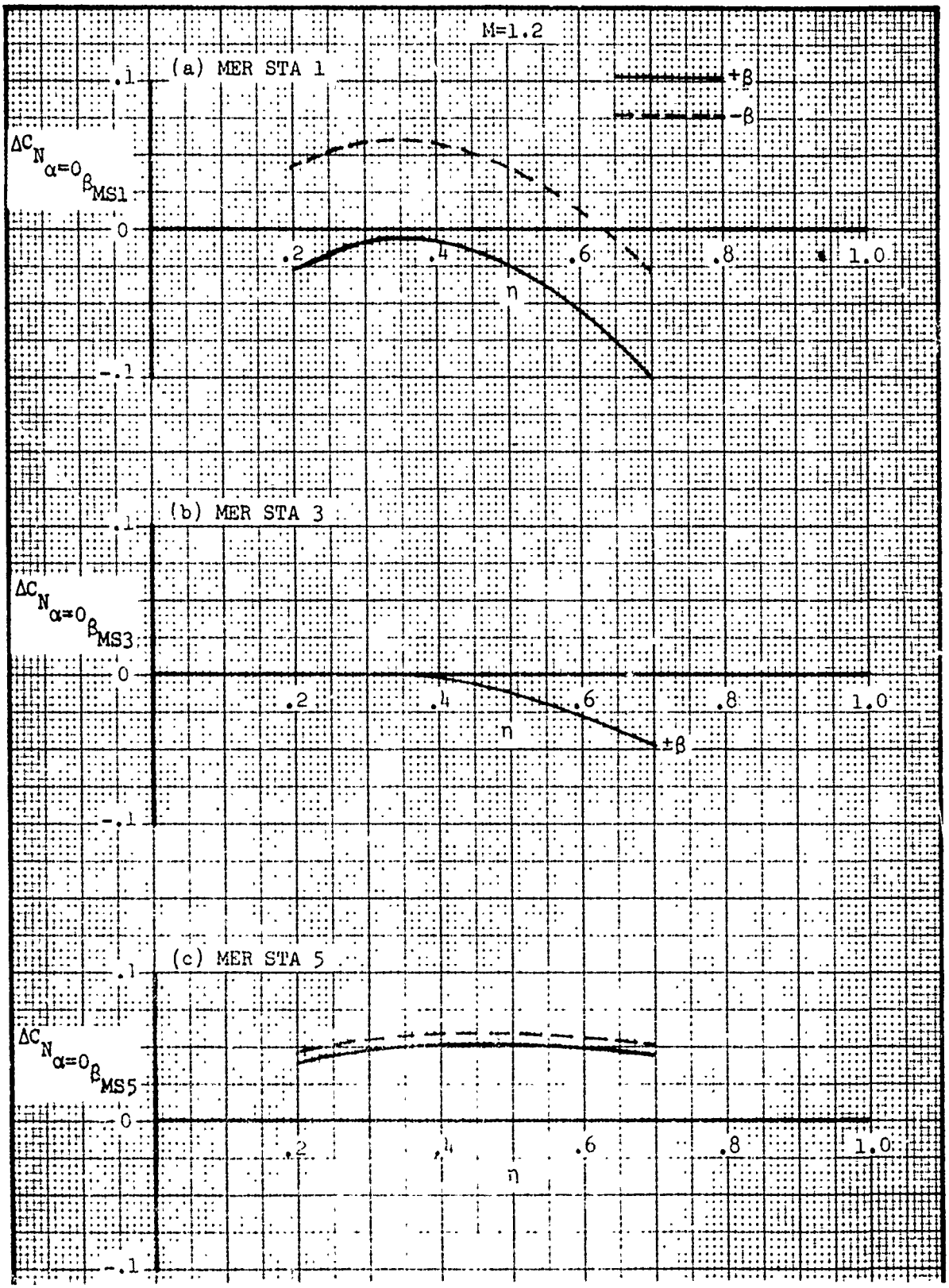


Figure 613. Incremental Normal Force Intercept Due to Yaw - Spanwise Correction at M=1.2 for MER Stations 1, 3, and 5

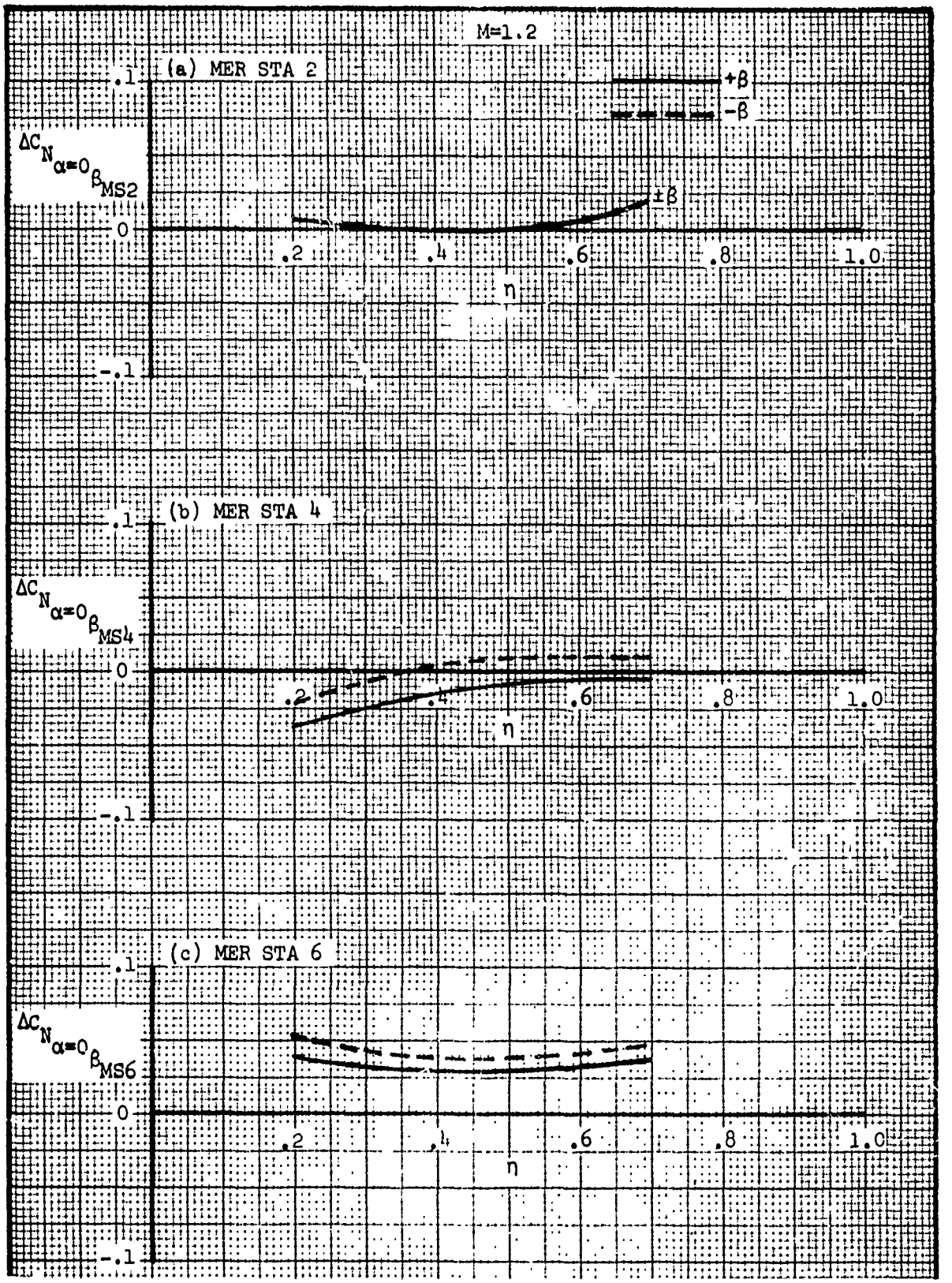


Figure 614. Incremental Normal Force Intercept Due to Yaw - Spanwise Correction at M = 1.2 for MER Stations 2, 4, and 6

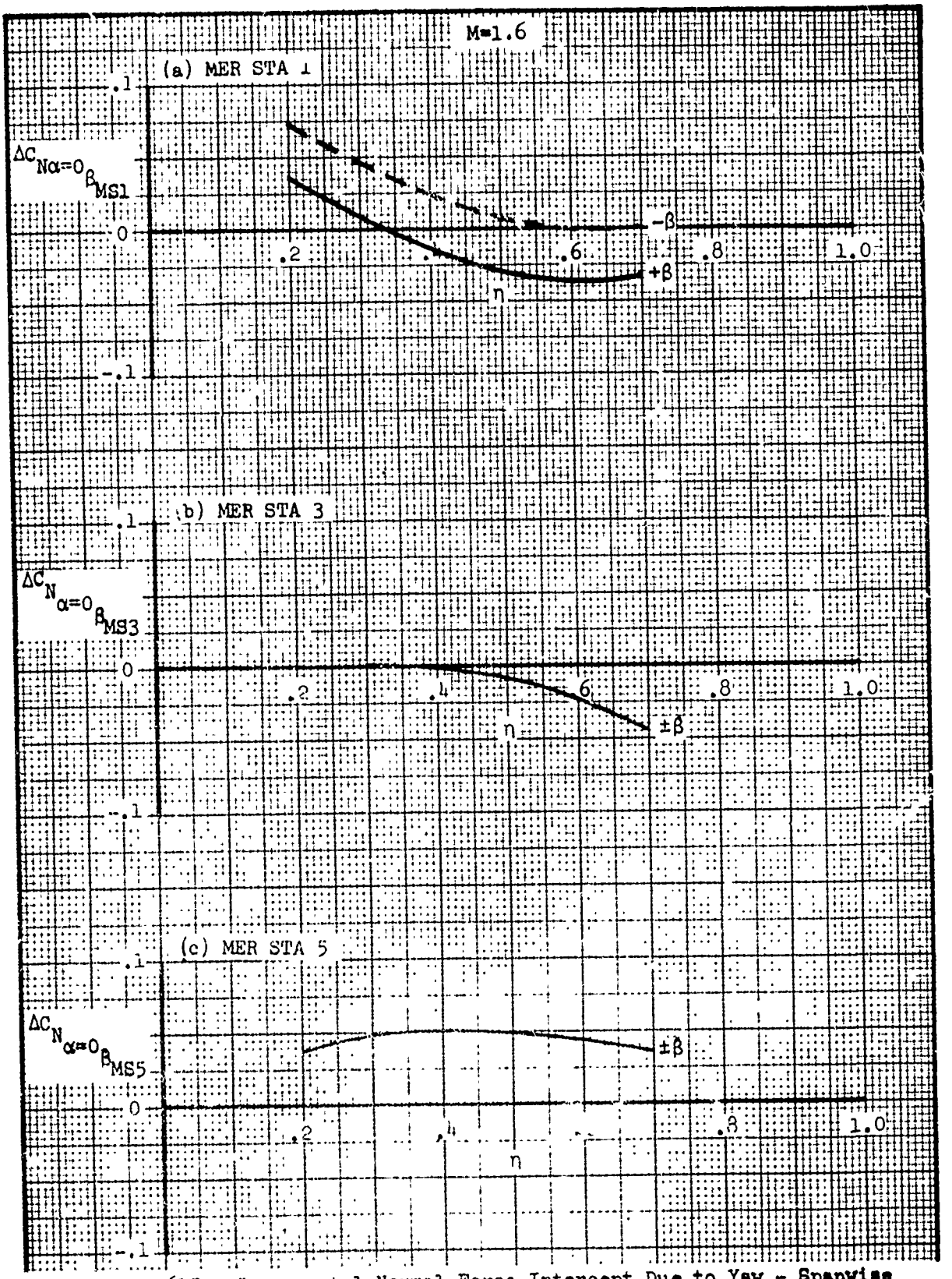


Figure 615. Incremental Normal Force Intercept Due to Yaw - Spanwise Correction at M=1.6 for MER Stations 1,3 and 5

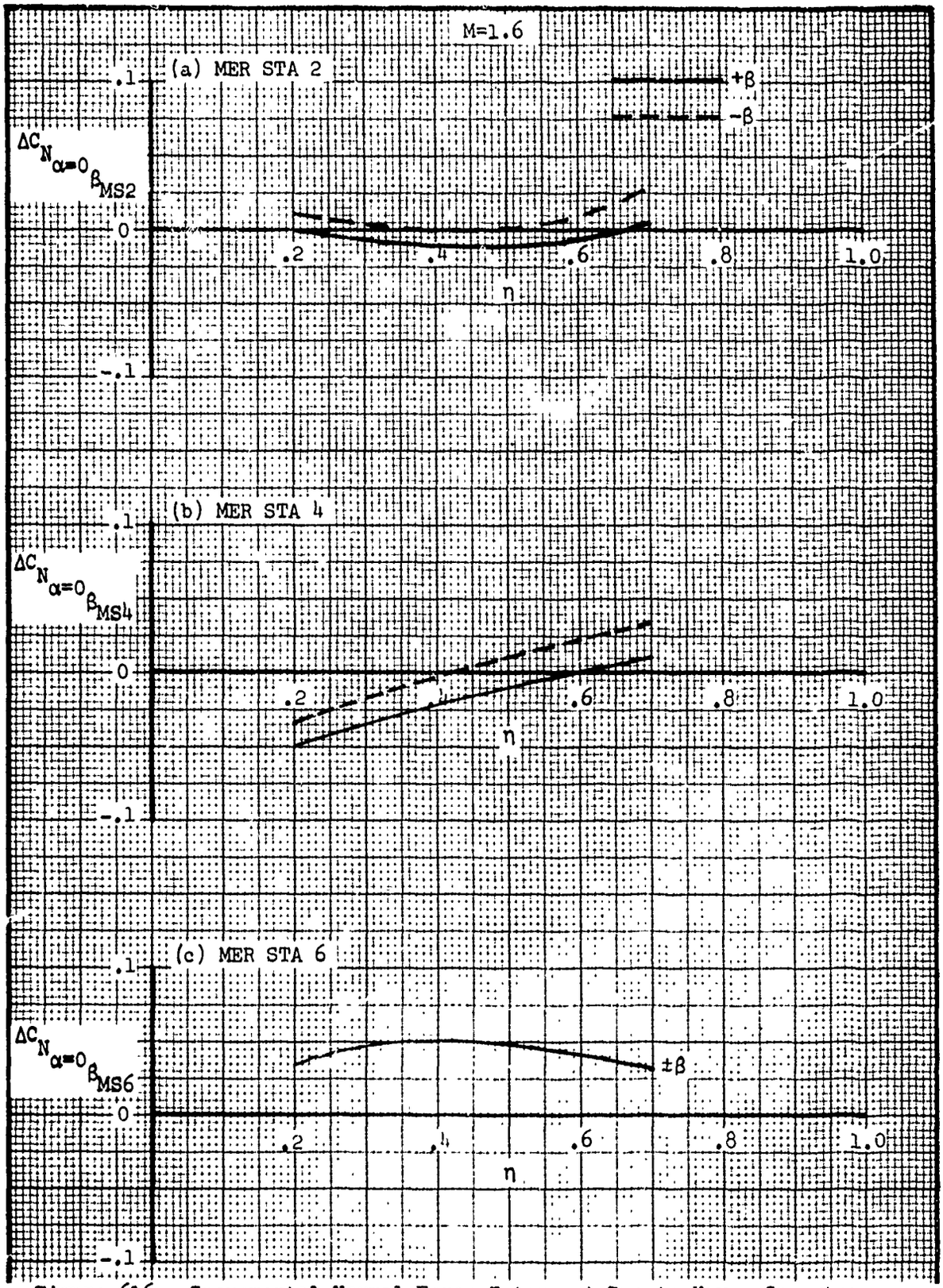


Figure 616. Incremental Normal Force Intercept Due to Yaw - Spanwise Correction at M=1.6 for MER Stations 2,4 and 6

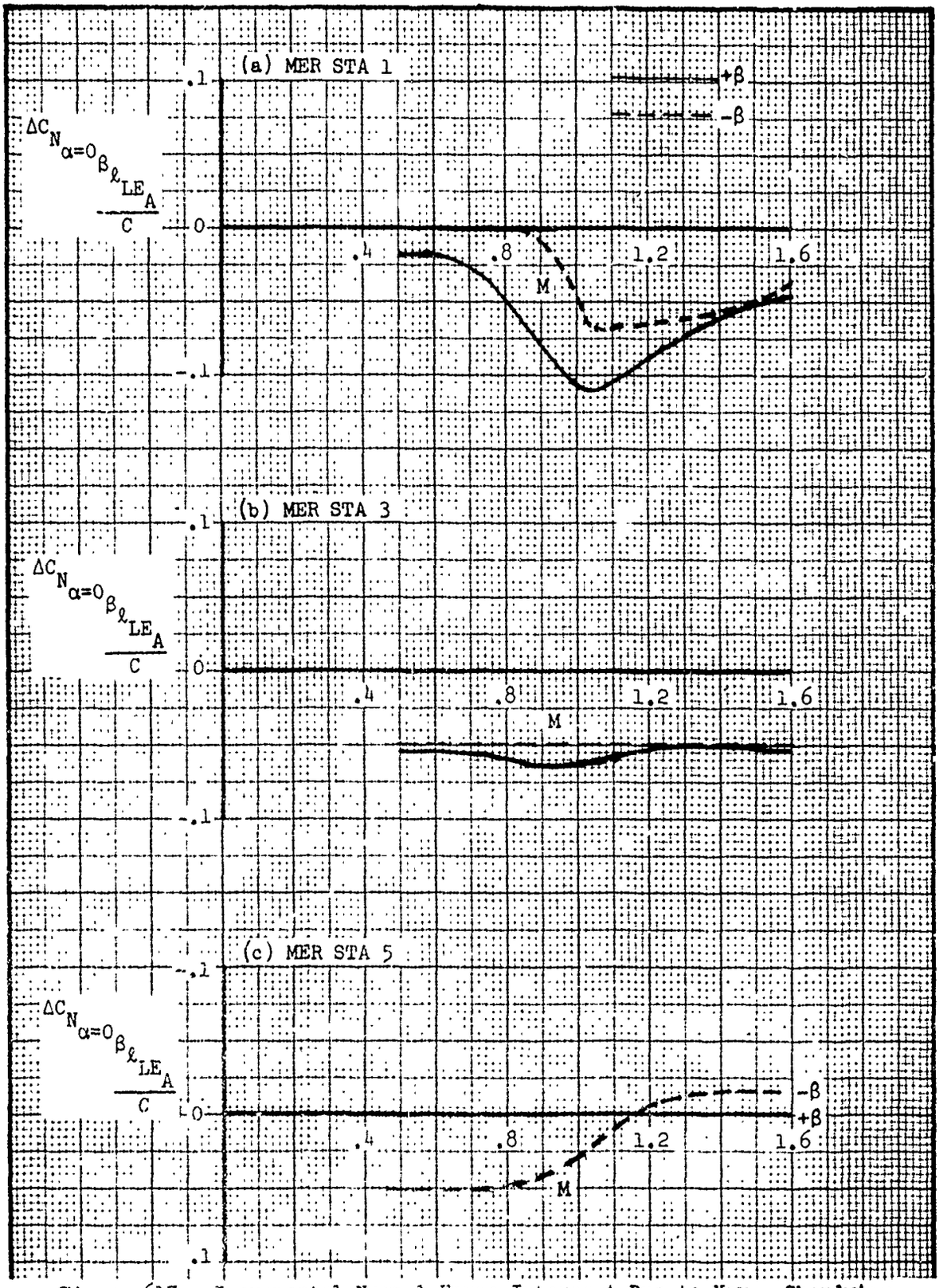


Figure 617. Incremental Normal Force Intercept Due to Yaw - Chordwise Correction for MER Stations 1,3, and 5

4.3.3 Increment - Adjacent Store Interference

Methods to predict the increment in captive store normal force variation with angle of attack, $\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha \\ INTF}}$, and the value at $\alpha=0$, $\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ INTF}}$, for multiple carried stores are presented within this section. The basic prediction is made as a function of minimum store to store separation distance, y_{INTF} (see Subsection 3.1.3), at discrete Mach numbers. The data are presented separately for the aft cluster of stores on MER STATIONS 1,3 and 5 and the forward cluster, MER STATIONS 2,4 and 6. Predictions are also separately made for inboard→outboard interference, the interfering store carried inboard of the subject captive store, and outboard→inboard interference, the interferring store carried outboard of the subject captive store. On the curves defining the basic prediction ADJ. SHOULDER refers to the MER shoulder store adjacent to the interfering store, OPPOSITE SHOULDER is the MER shoulder store furthest displaced laterally from the interfering store, and ℄ STORE is the MER centerline store, MER Station 1 or 2.

4.3.3.1 Slope Prediction

The equations governing the prediction of incremental normal force variation with angle of attack are presented below.

INTERFERING STORES CARRIED INBOARD

MER STATIONS 1,2,3,4,5, and 6 (MS1-6):

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha \\ INTF \\ MS1-6}} = \left(\sum \Delta C_{N_{\substack{\alpha \\ INTF \\ IB\rightarrow OB \\ MS1-6}}}\right) K_{SCALE_{NF}}$$

where:

ΔC_{N_α} INTF IB→OB - Incremental normal force slope coefficient due to inboard to outboard interference as a function y_{INTF}, $\frac{1}{deg}$, see Table 17.

$K_{SCALE_{NF}}$ - Normal force scale factor, ft^2 , see Section IV.

INTERFERING STORES CARRIED OUTBOARD

MER STATIONS 1,2,3,4,5, and 6 (MS1-6)

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha \\ INTF \\ MS1-6}} = \left(\sum \Delta C_{N_{\substack{\alpha \\ INTF \\ OB\rightarrow IB \\ MS1-6}}} + \sum \Delta^2 C_{N_{\substack{\alpha \\ INTF \\ MS1-6}}}\right) K_{SCALE_{NF}}$$

where:

ΔC_{N_α} INTF OB→IB - Incremental normal force slope coefficient due to outboard to inboard interference as a function of $y_{INTF}, \frac{1}{deg}$, see Table 17.

$\Delta^2 C_{N_{INTF}}$ - Increment to $\Delta C_{N_{\substack{\alpha \\ INTF \\ OB\rightarrow IB}}}$ as a function of store nose separation, $\sqrt{x^2_{INTF} + y^2_{INTF}}$ (see Subsection 3.1.3), which is assumed to be negative when the interfering store is aft of the subject captive store, $\frac{1}{deg}$.

MER STA 1 - Figure 634

MER STA 2 - Figure 633

MER STA 3 - Figure 634

MER STA 4 - Figure 633

MER STA 5 - Figure 634

MER STA 6 - Figure 633

$K_{SCALE_{NF}}$ - Normal force scale factor, ft^2 , see Section IV.

INTERFERING STORES CARRIED INBOARD AND OUTBOARD

MER STATIONS 1,2,3,4,5, and 6 (MS1-6)

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha \\ INTF \\ MS1-6}} = \left[K_{INTC_2} + K_{SLOPE_2}\left(\sum \Delta C_{N_{\substack{\alpha \\ INTF \\ IB\rightarrow OB \\ MS1-6}}} + \sum \Delta C_{N_{\substack{\alpha \\ INTF \\ OB\rightarrow IB \\ MS1-6}}} + \sum \Delta^2 C_{N_{\substack{\alpha \\ INTF \\ MS1-6}}}\right)\right] K_{SCALE_{NF}}$$

where:

K_{INTC_2} - Intercept for the inboard - outboard interference combination correction for normal force slope, $\frac{1}{deg}$, Figure 636.

K_{SLOPE_2} - Slope for the inboard - outboard interference combination correction for normal force slope, Figure 635.

$\Delta C_{N_{\substack{\alpha \\ INTF \\ IB\rightarrow OB}}}$ - Previously defined.

$\Delta C_{N_{\substack{\alpha \\ INTF \\ OB\rightarrow IB}}}$ - Previously defined.

$\Delta^2 C_{N_\alpha}$ - Previously defined.
$_{INTF}$

$K_{SCALE_{NF}}$ - Normal force scale factor, ft^2 , see Section IV.

The above equations define the interference increment calculation at a given Mach number. For Mach numbers other than those presented, M = 0.7, 0.9, 1.05, 1.2, 1.6, these guidelines should be followed. If the subject Mach number is less than M = 0.7, use the value at M = 0.7. For other Mach numbers linear interpolation should be used between the Mach numbers which are presented.

TABLE 17. INCREMENTAL NORMAL FORCE SLOPE COEFFICIENT DUE TO INTERFERENCE - FIGURE LOCATION GUIDE

ΔC_{N_α} INTF	MACH NUMBER 0.7	0.9	1.05	1.2	1.6
	Figure Number				
Adj. Shoulder- Fwd. Cluster	618	619	620	621	622
Adj. Shoulder- Aft Cluster	618	619	620	621	622
℄ Store- Fwd. Cluster	623	624	625	626	627
℄ Store- Aft Cluster	623	624	625	626	627
Opposite Shoulder- Fwd. Cluster	628	629	630	631	632
Opposite Shoulder- Aft Cluster	628	629	630	631	632

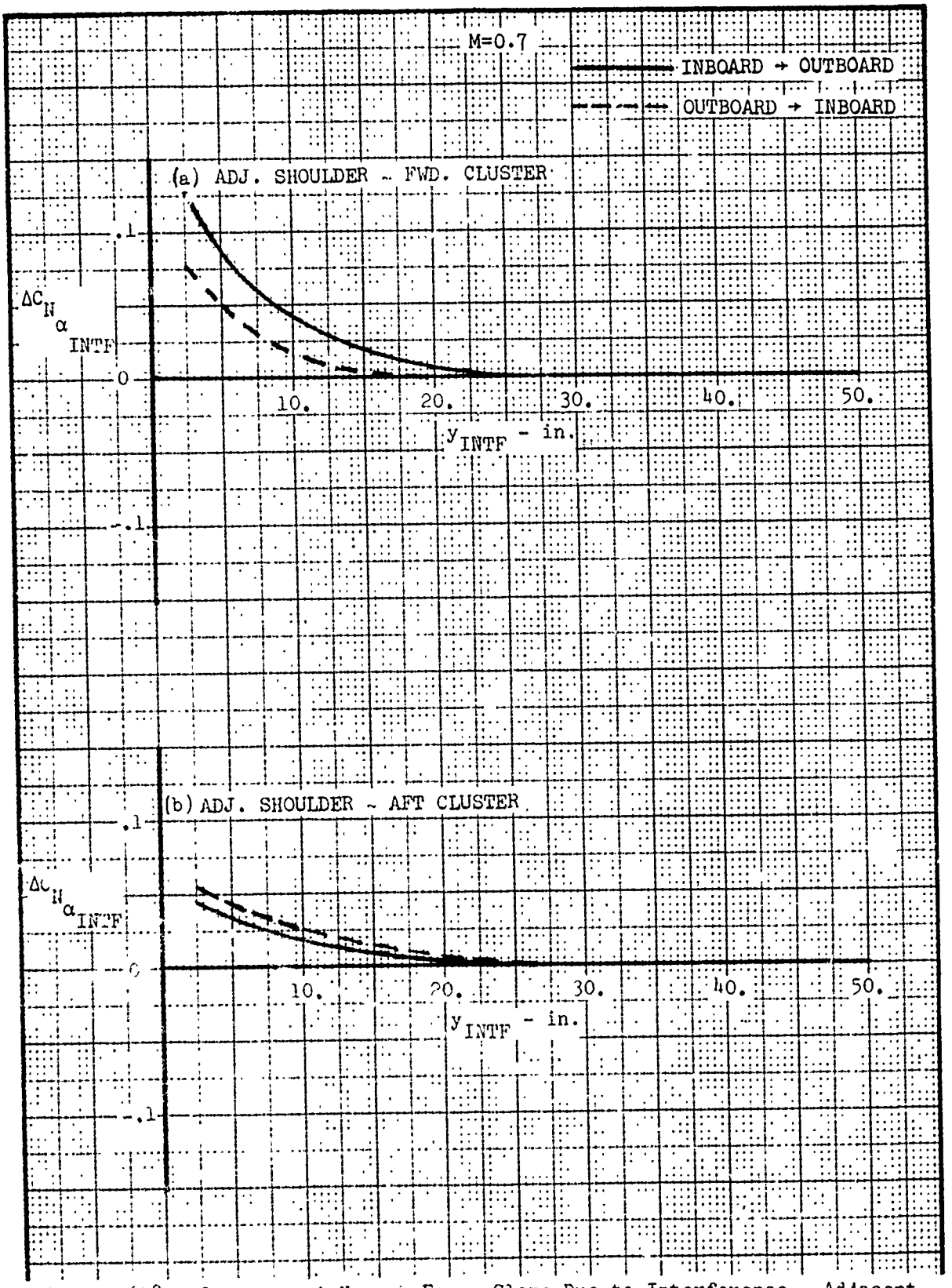


Figure 618. Incremental Normal Force Slope Due to Interference - Adjacent Shoulder at M=0.7

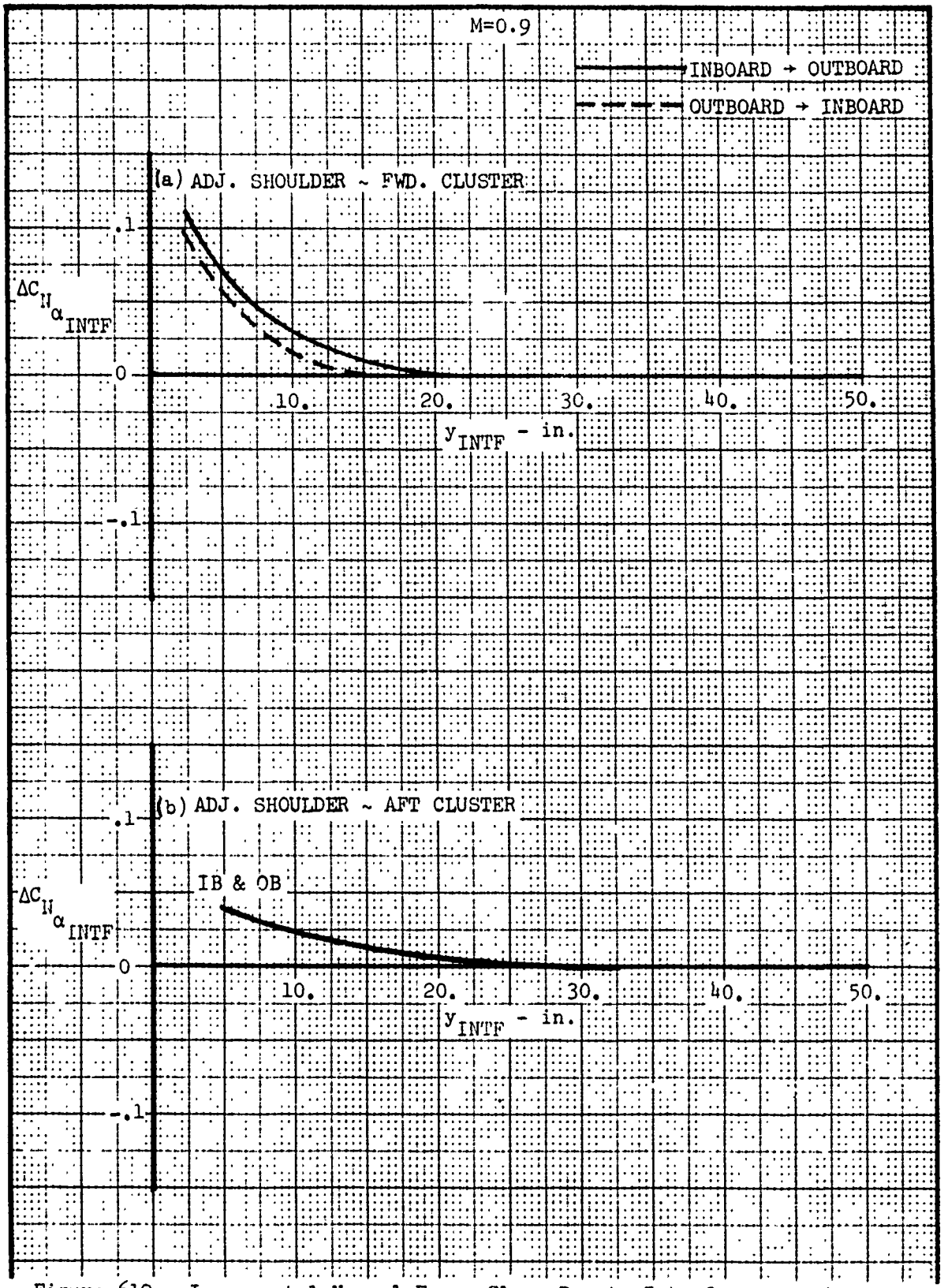


Figure 619. Incremental Normal Force Slope Due to Interference - Adjacent Shoulder at M=0.9

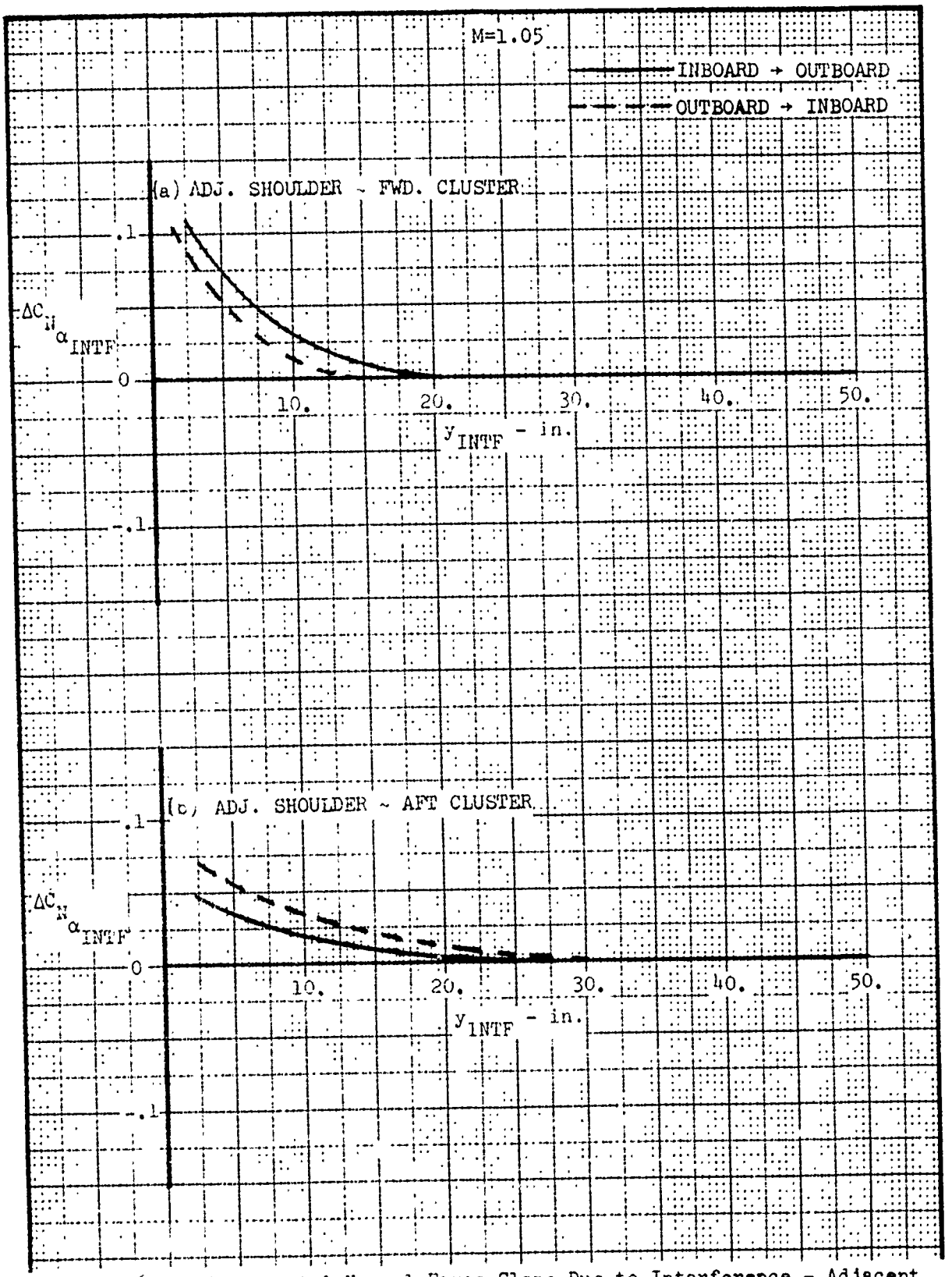


Figure 620. Incremental Normal Force Slope Due to Interference - Adjacent Shoulder at M=1.05

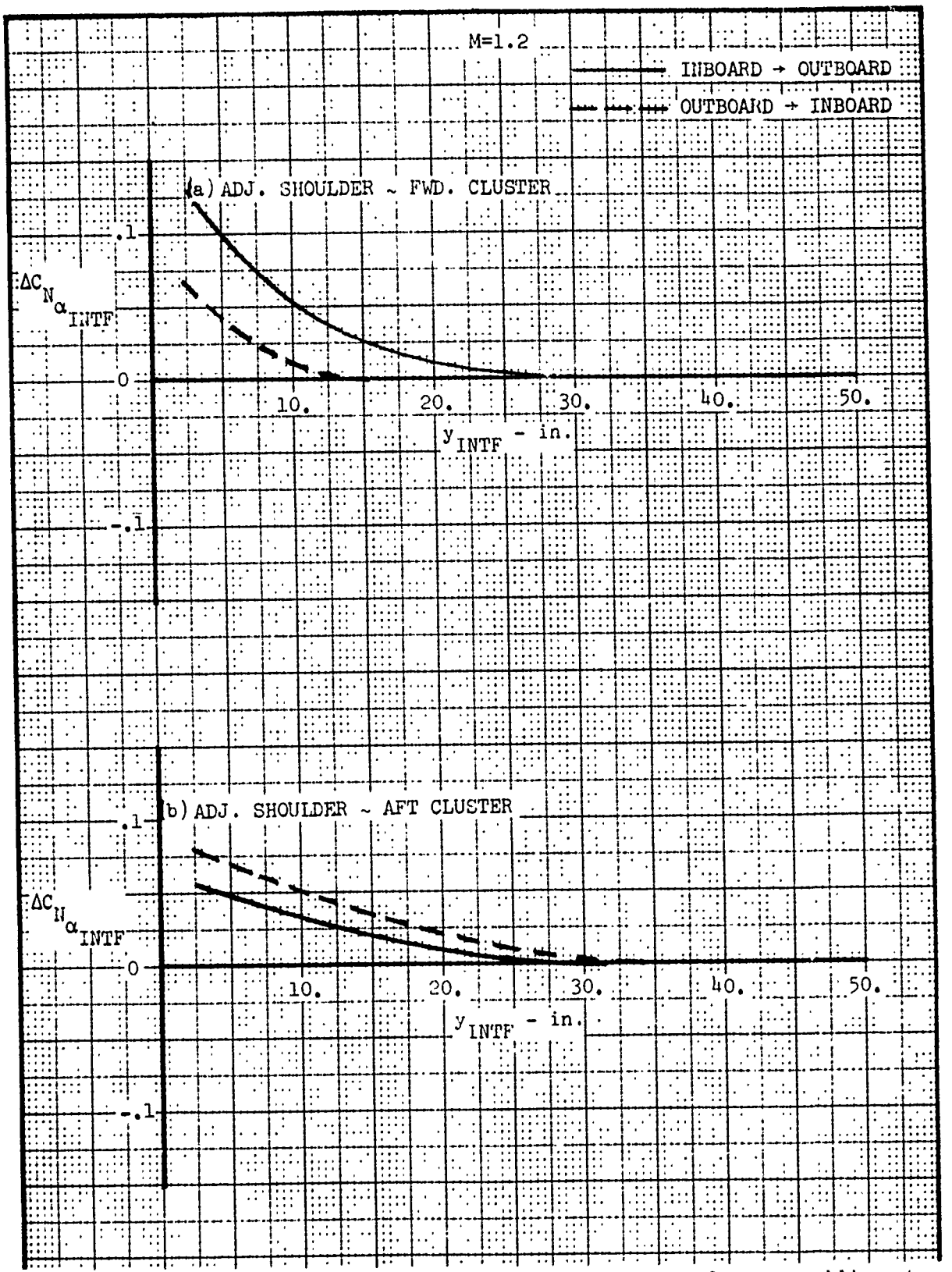


Figure 621. Incremental Normal Force Slope Due to Interference - Adjacent Shoulder at M=1.2

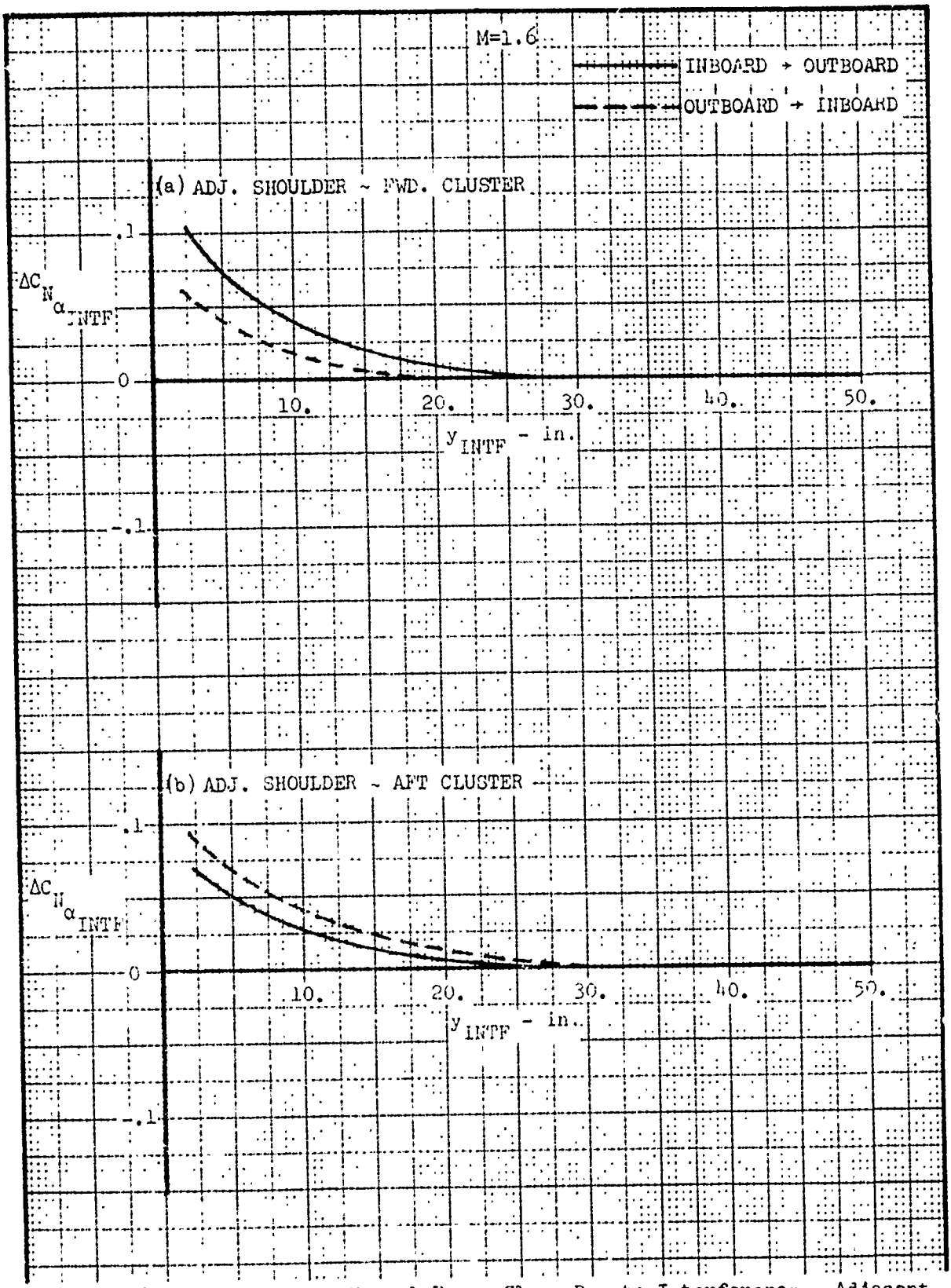


Figure 622. Incremental Normal Force Slope Due to Interference - Adjacent Shoulder at M=1.6

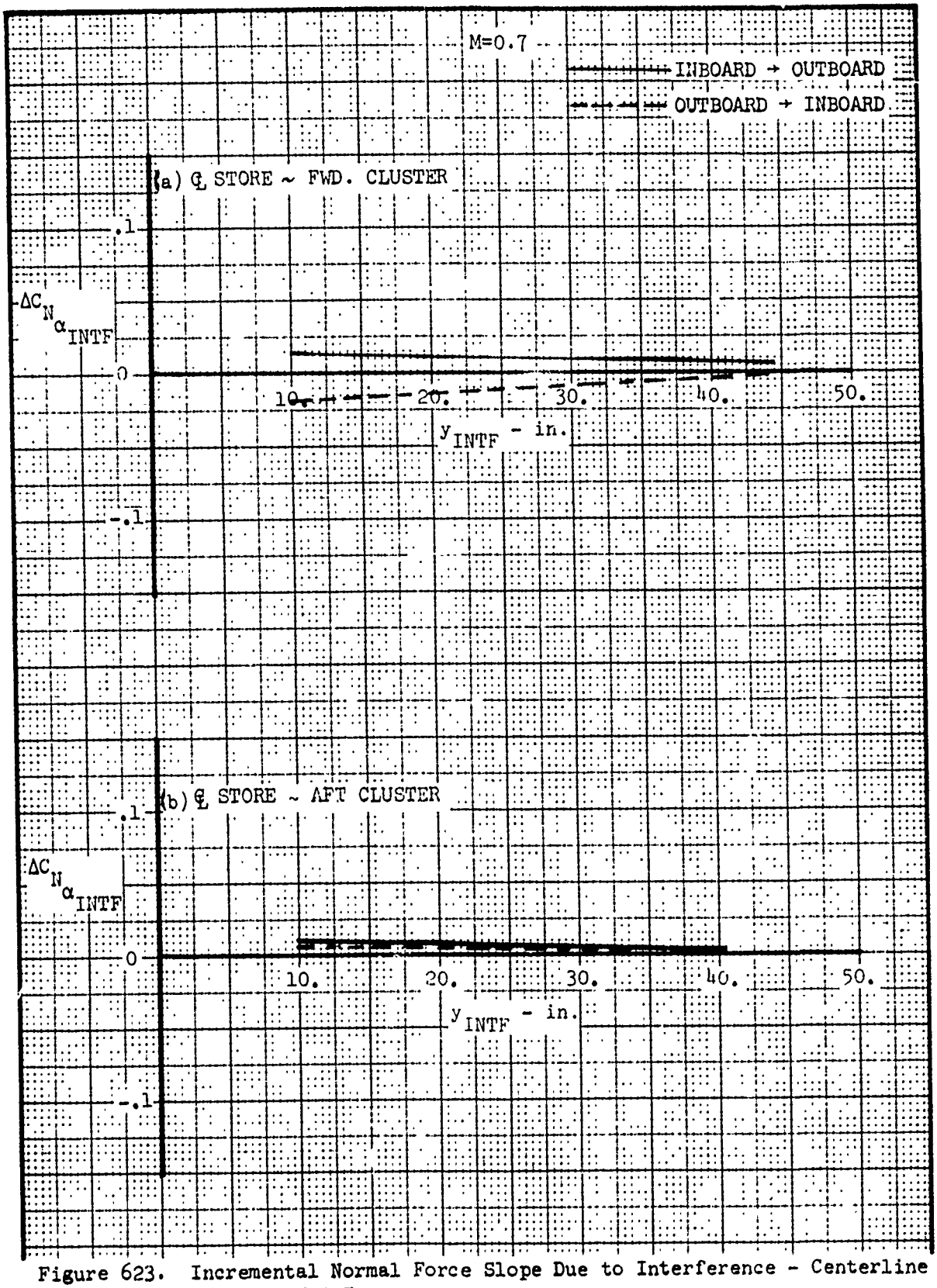


Figure 623. Incremental Normal Force Slope Due to Interference - Centerline Store at M=0.7

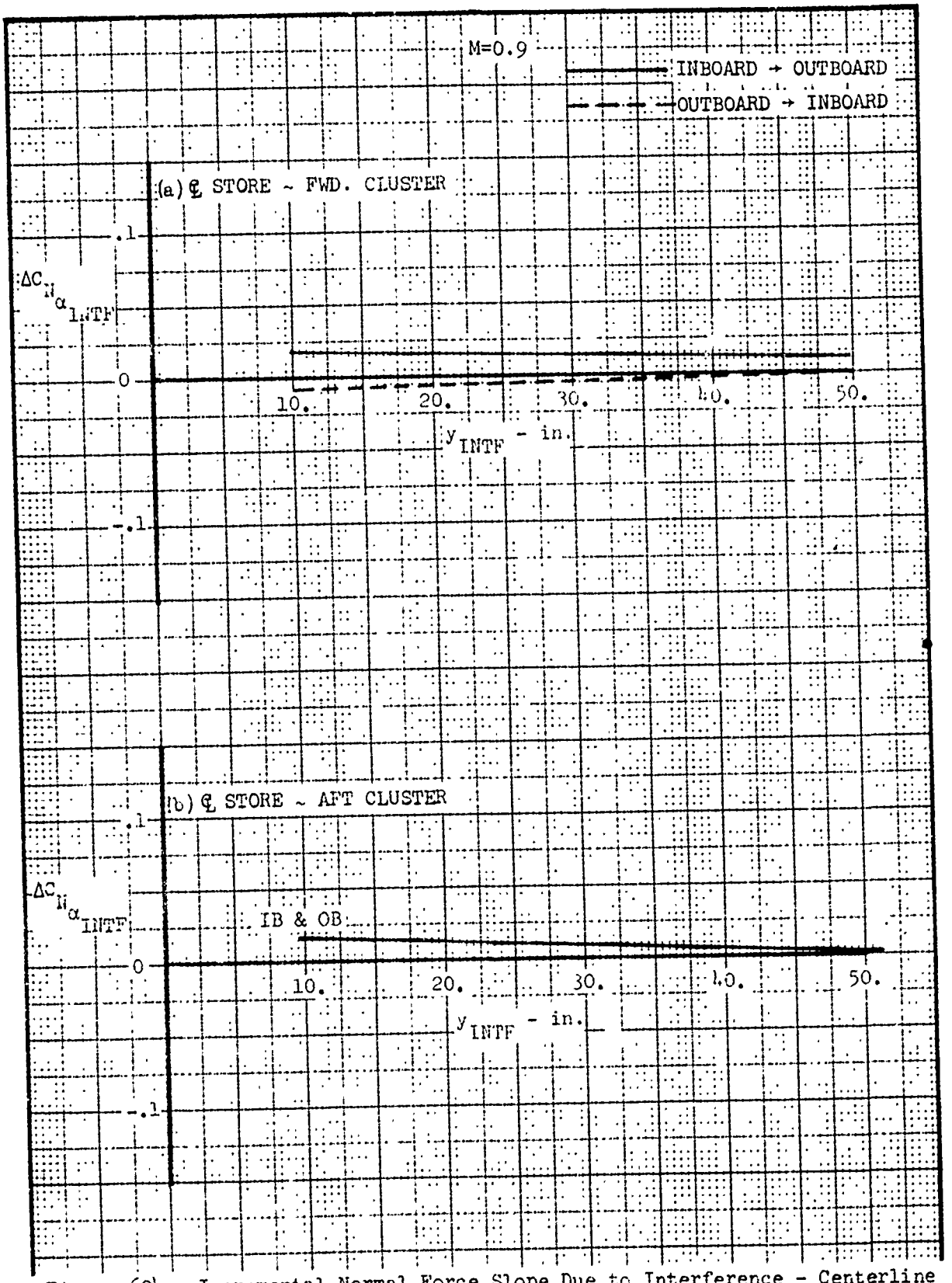


Figure 62a. Incremental Normal Force Slope Due to Interference - Centerline Store at M=0.9

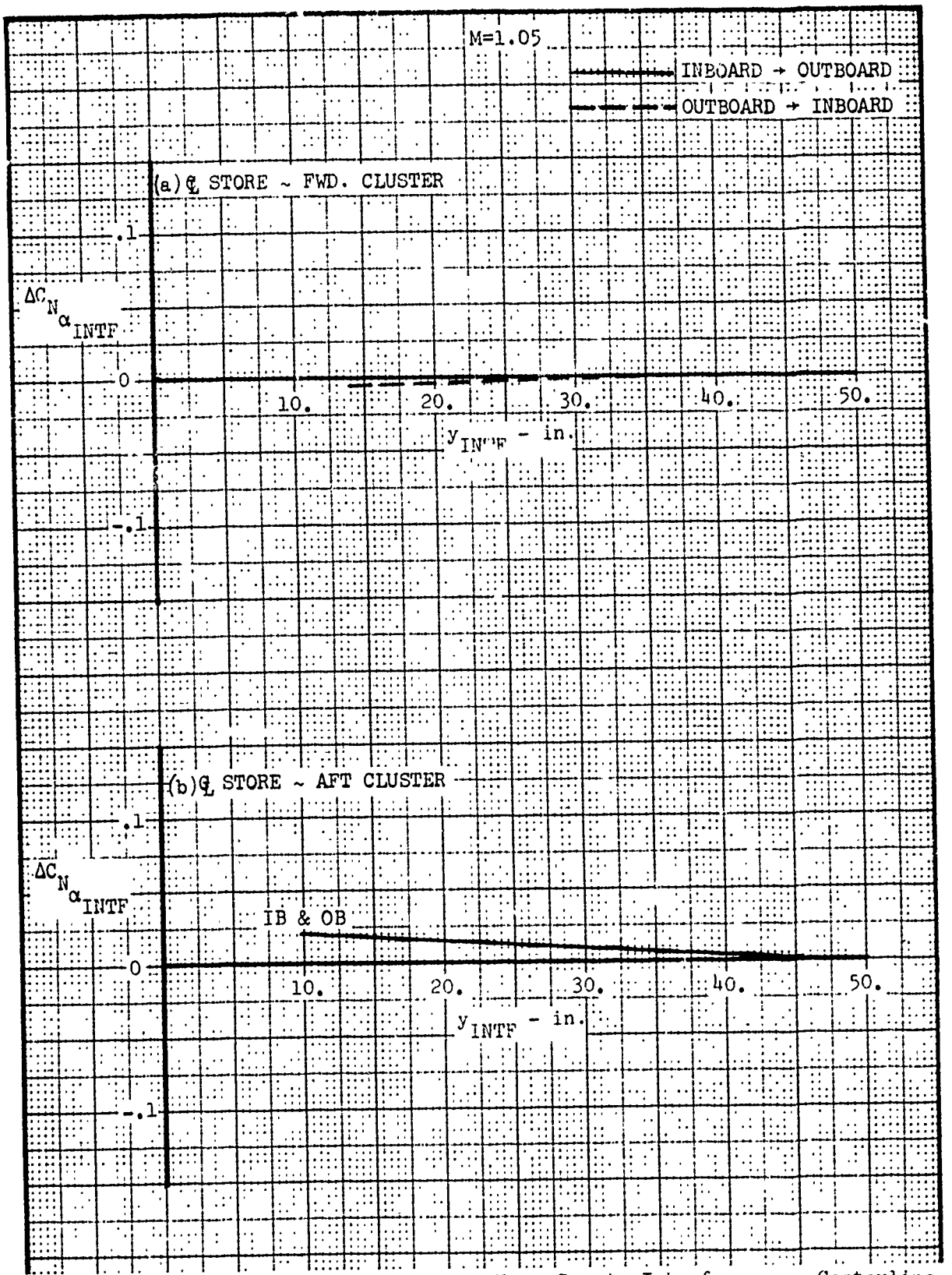


Figure 625. Incremental Normal Force Slope Due to Interference - Centerline Store at M=1.05

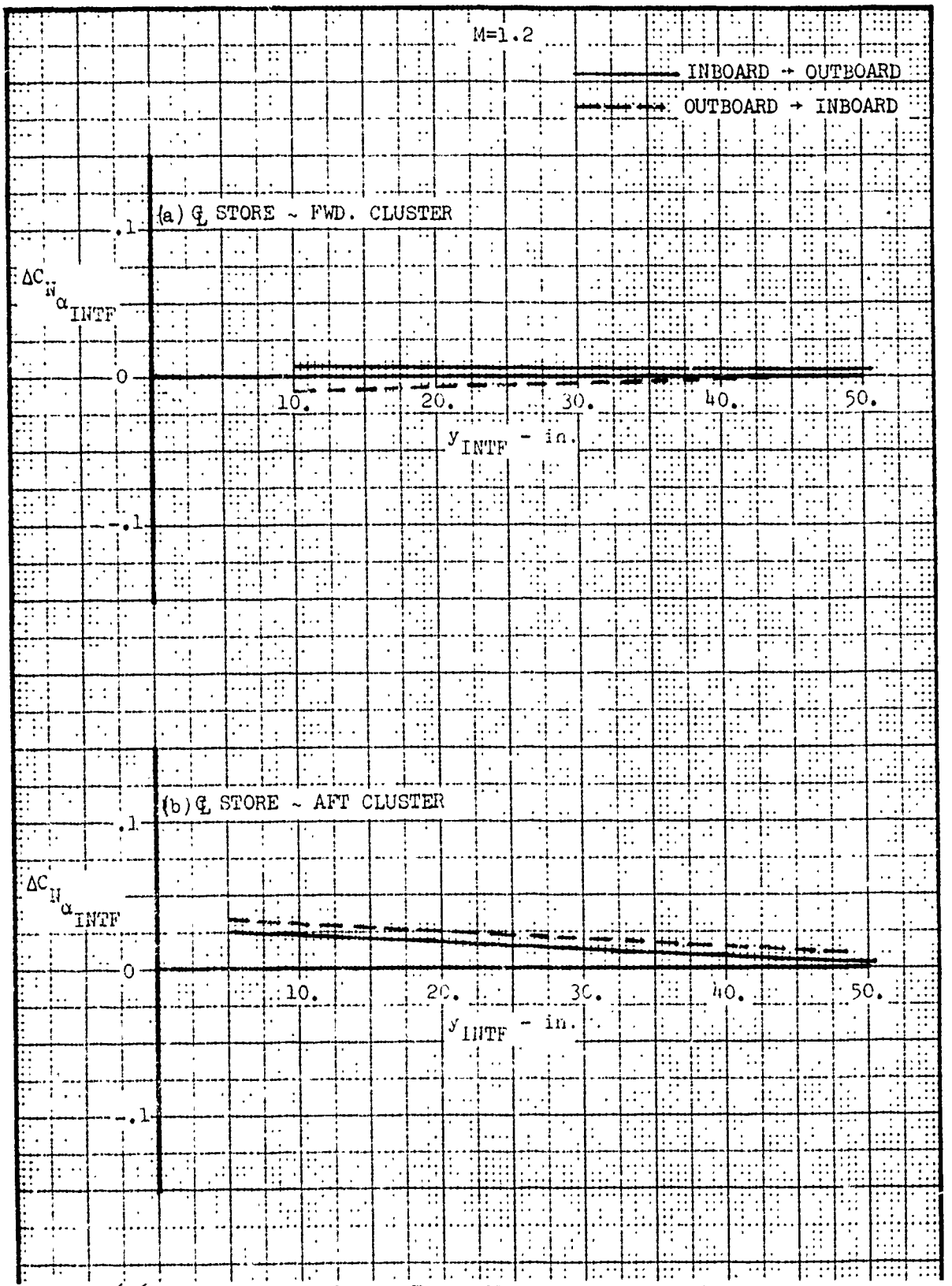


Figure 626. Incremental Normal Force Slope Due to Interference - Centerline Store at M=1.2

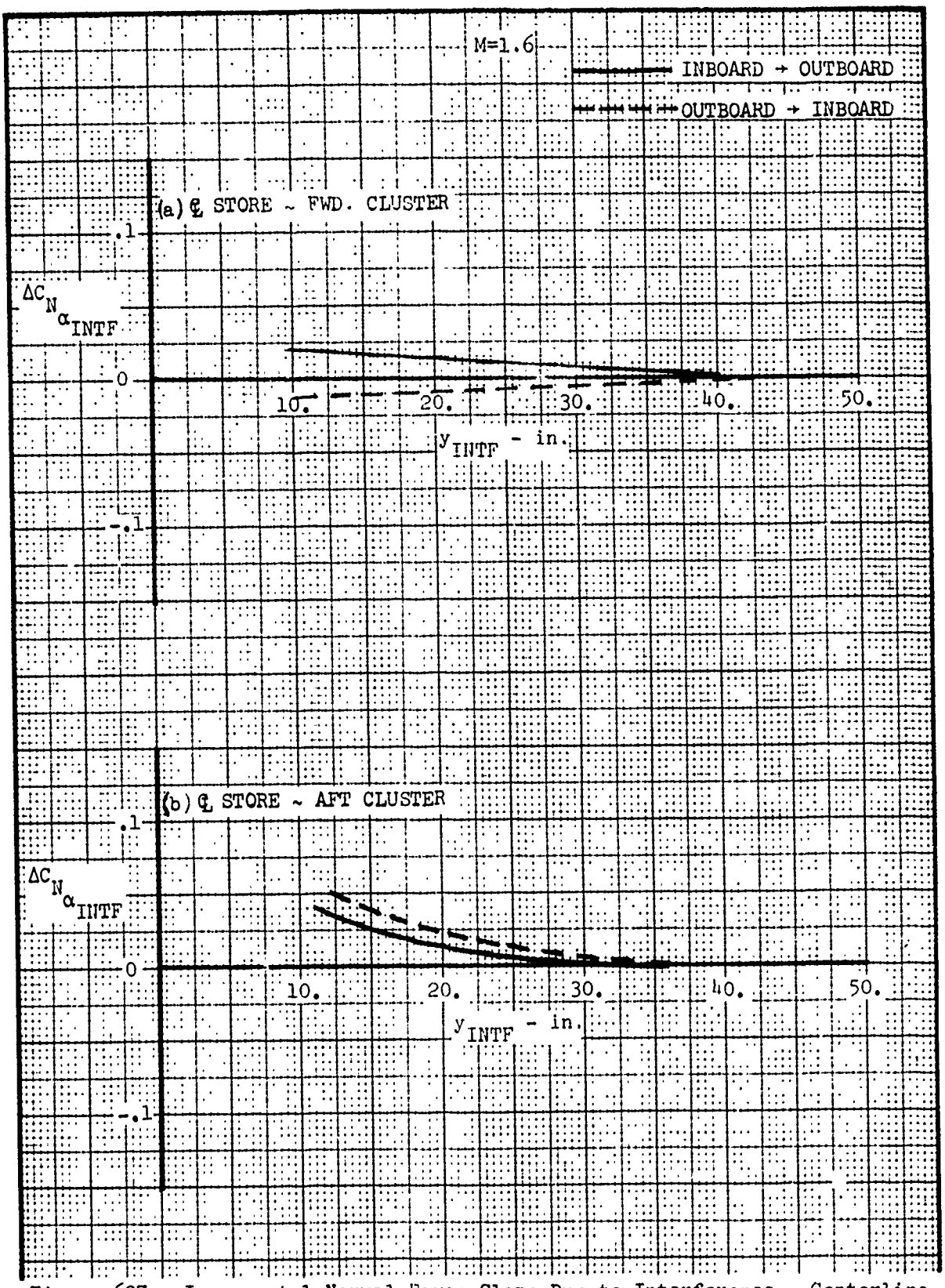


Figure 627. Incremental Normal Force Slope Due to Interference - Centerline Store at M=1.6

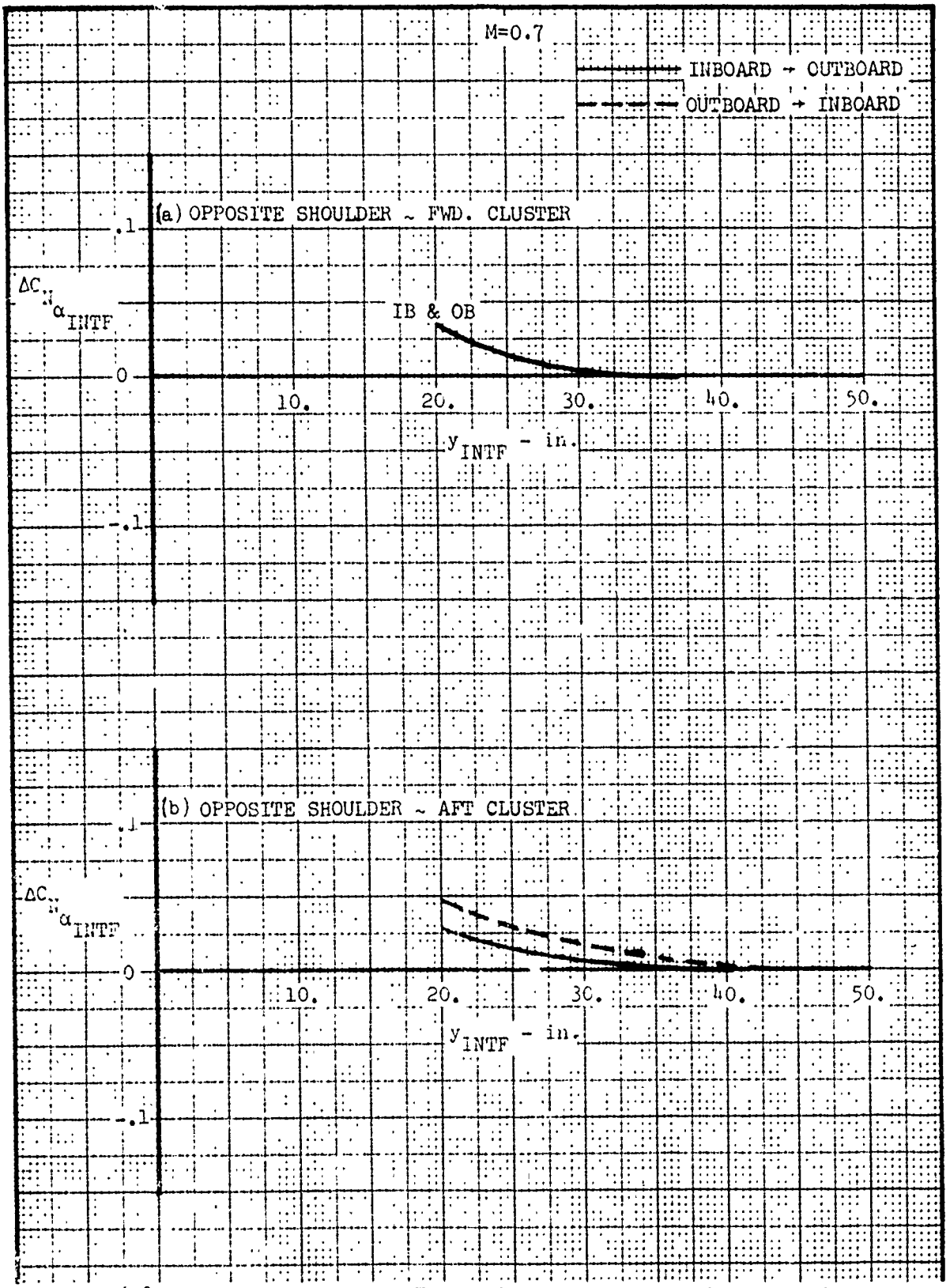


Figure 628. Incremental Normal Force Slope Due to Interference - Opposite Shoulder at M=0.7

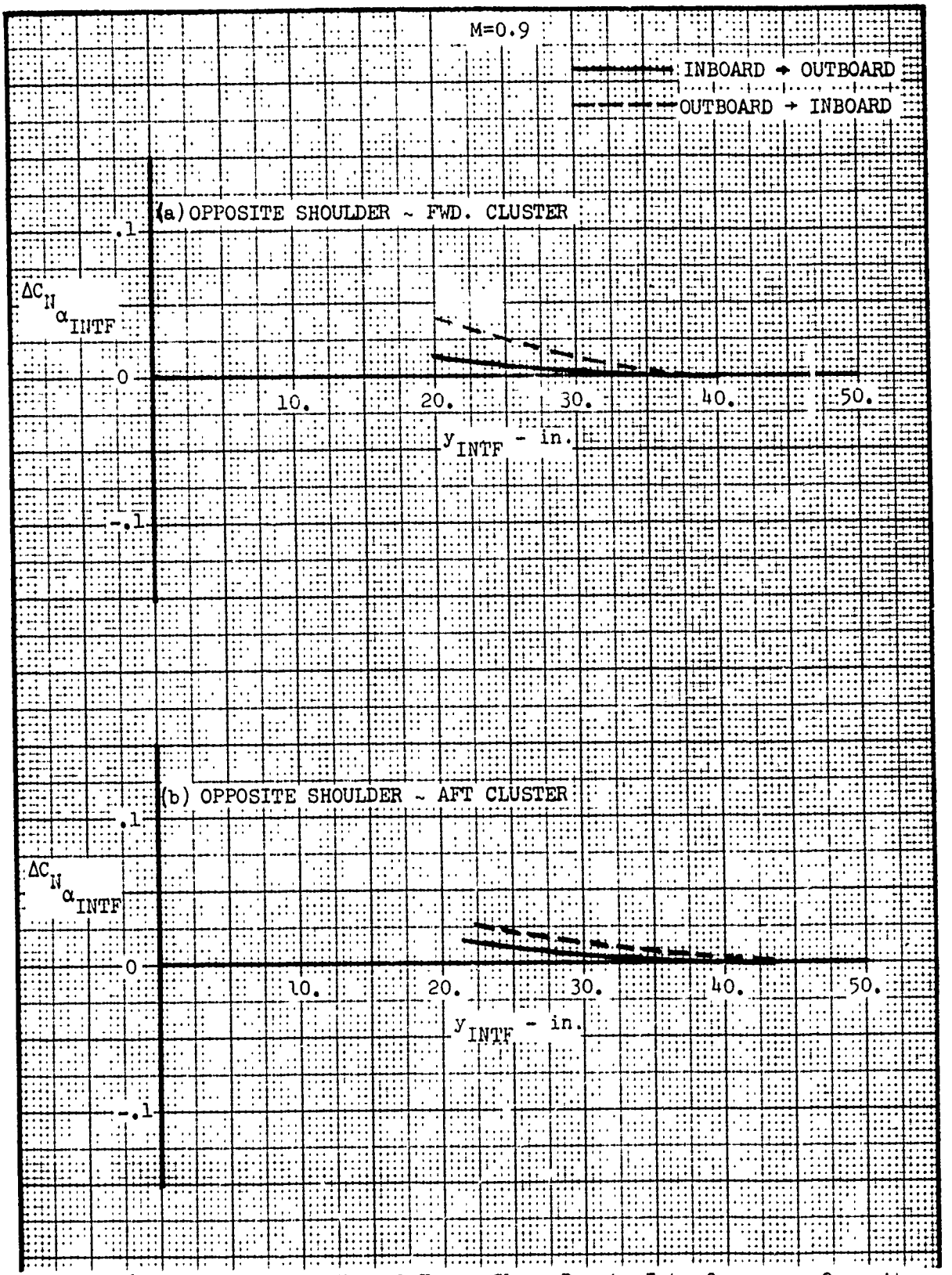


Figure 629. Incremental Normal Force Slope Due to Interference - Opposite Shoulder at M=0.9

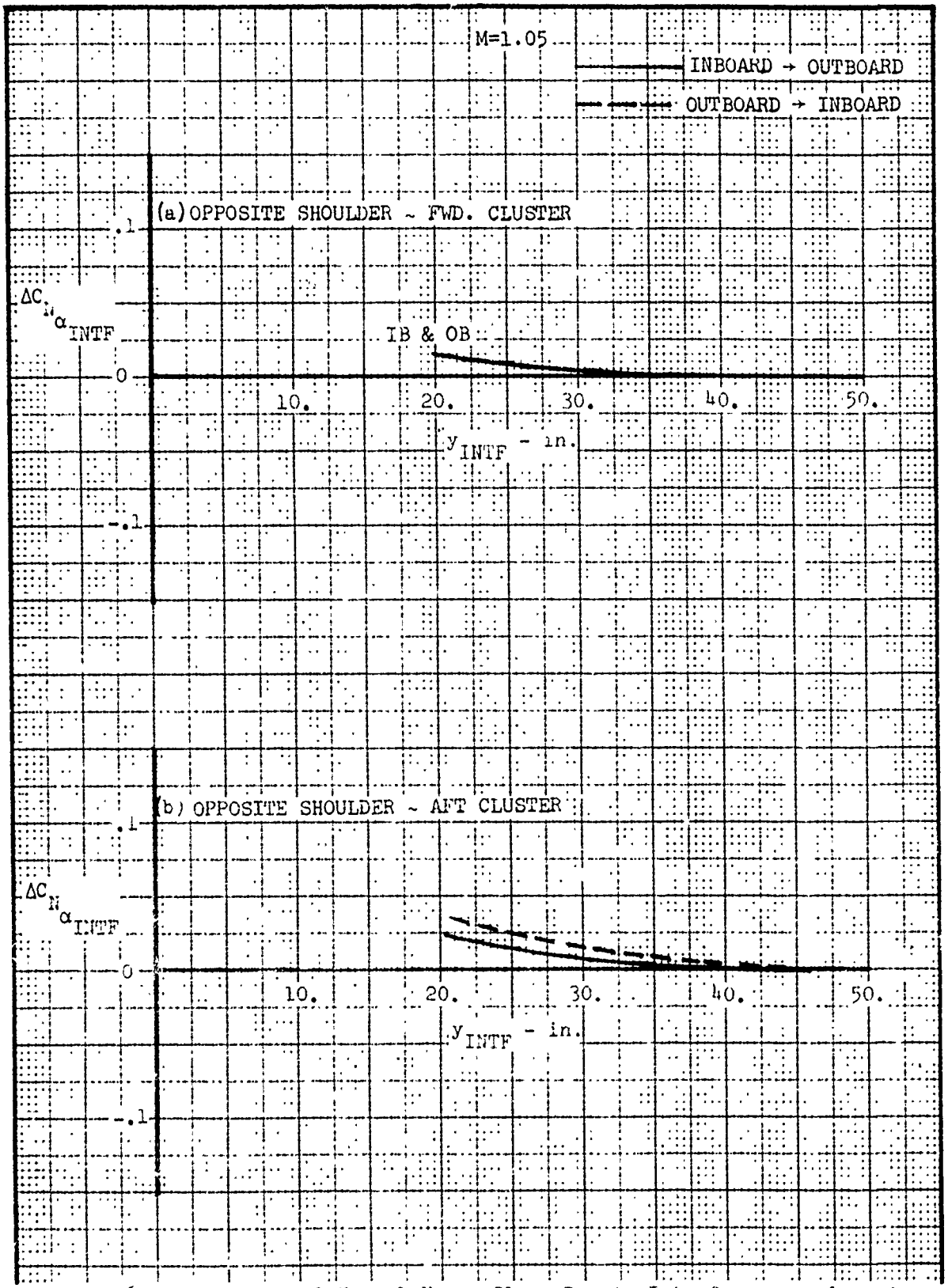


Figure 630. Incremental Normal Force Slope Due to Interference - Opposite Shoulder at M=1.05

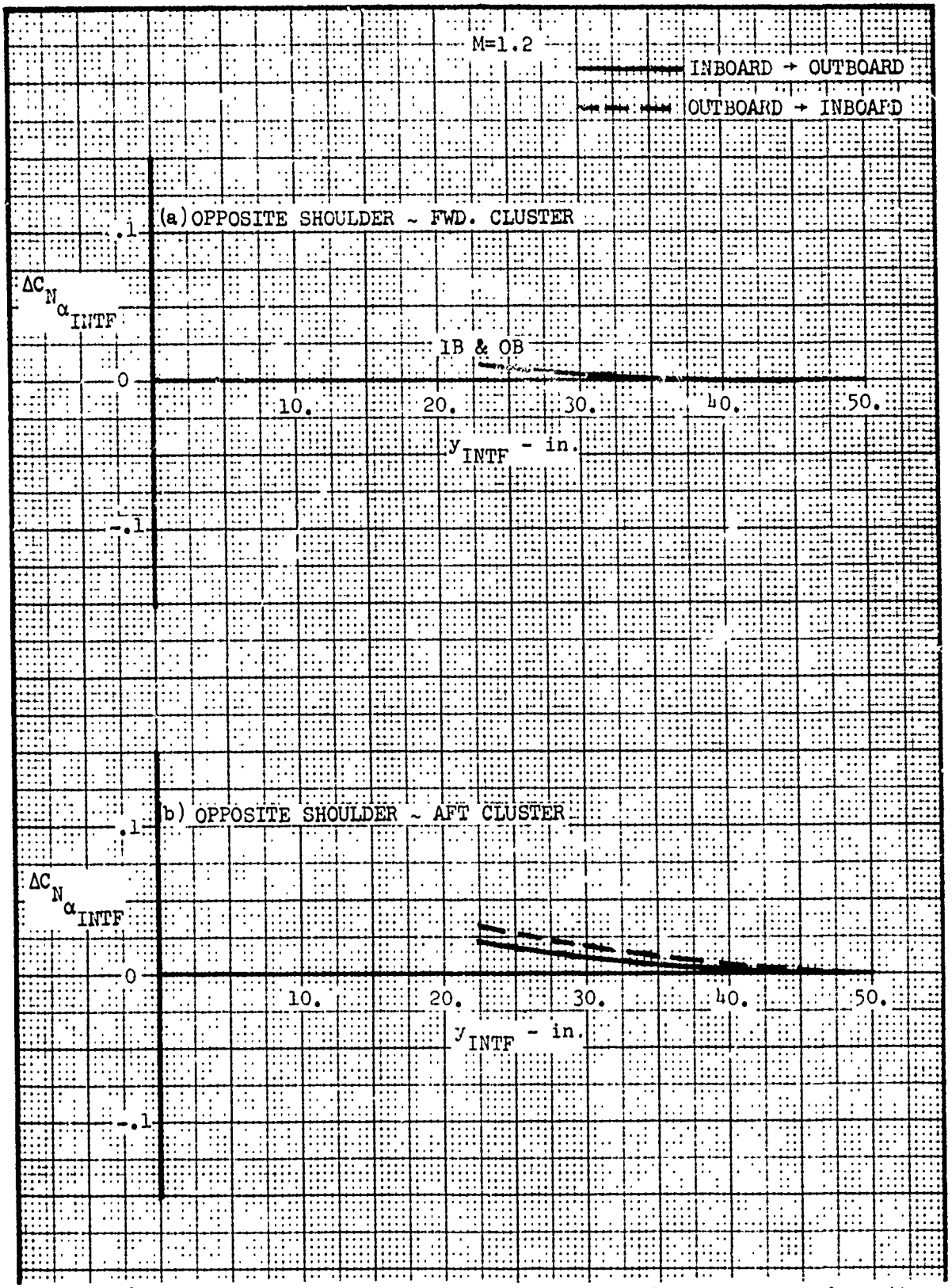


Figure 631. Incremental Normal Force Slope Due to Interference - Opposite Shoulder at M=1.2

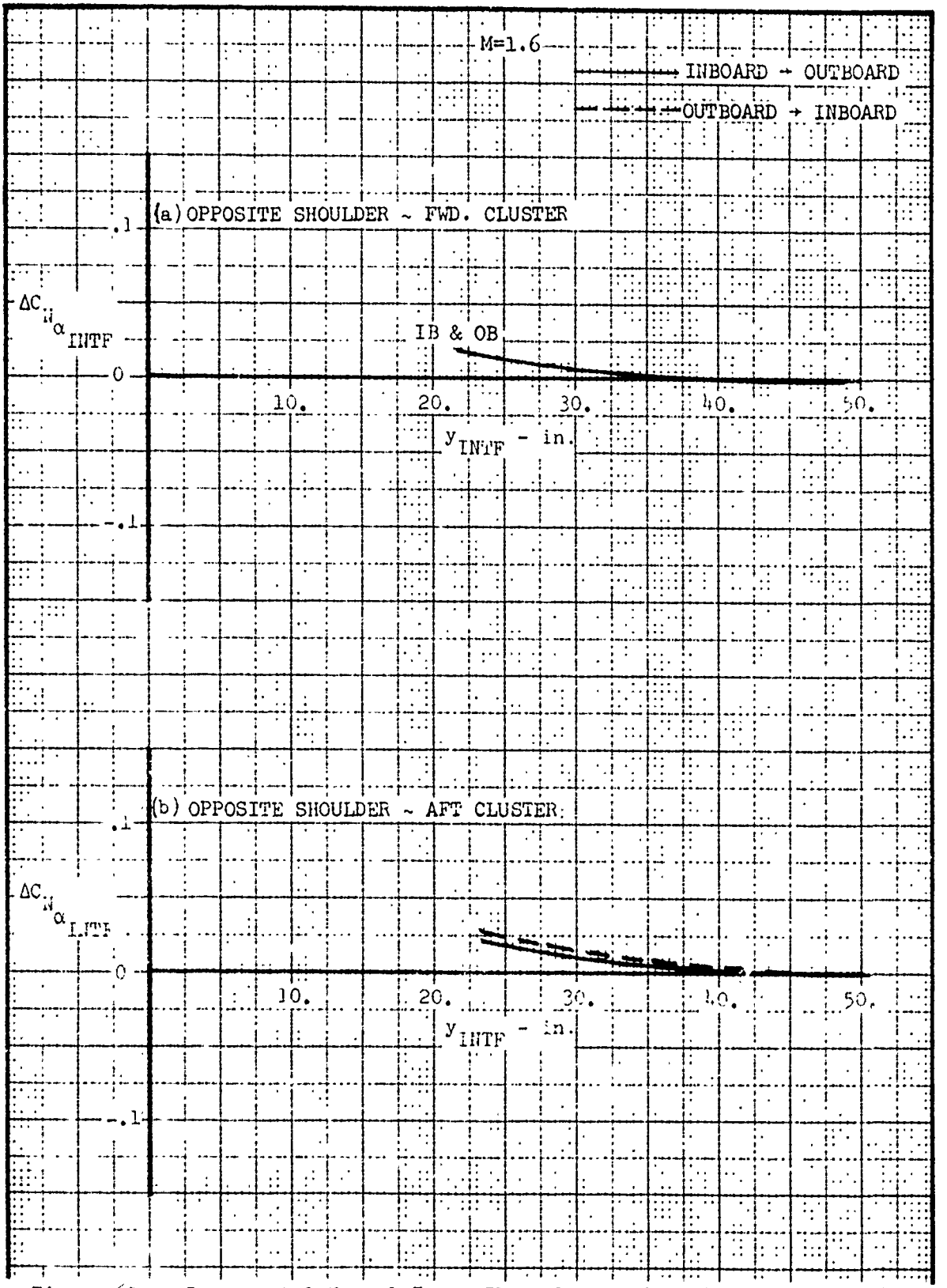


Figure 632. Incremental Normal Force Slope Due to Interference - Opposite Shoulder at M=1.6

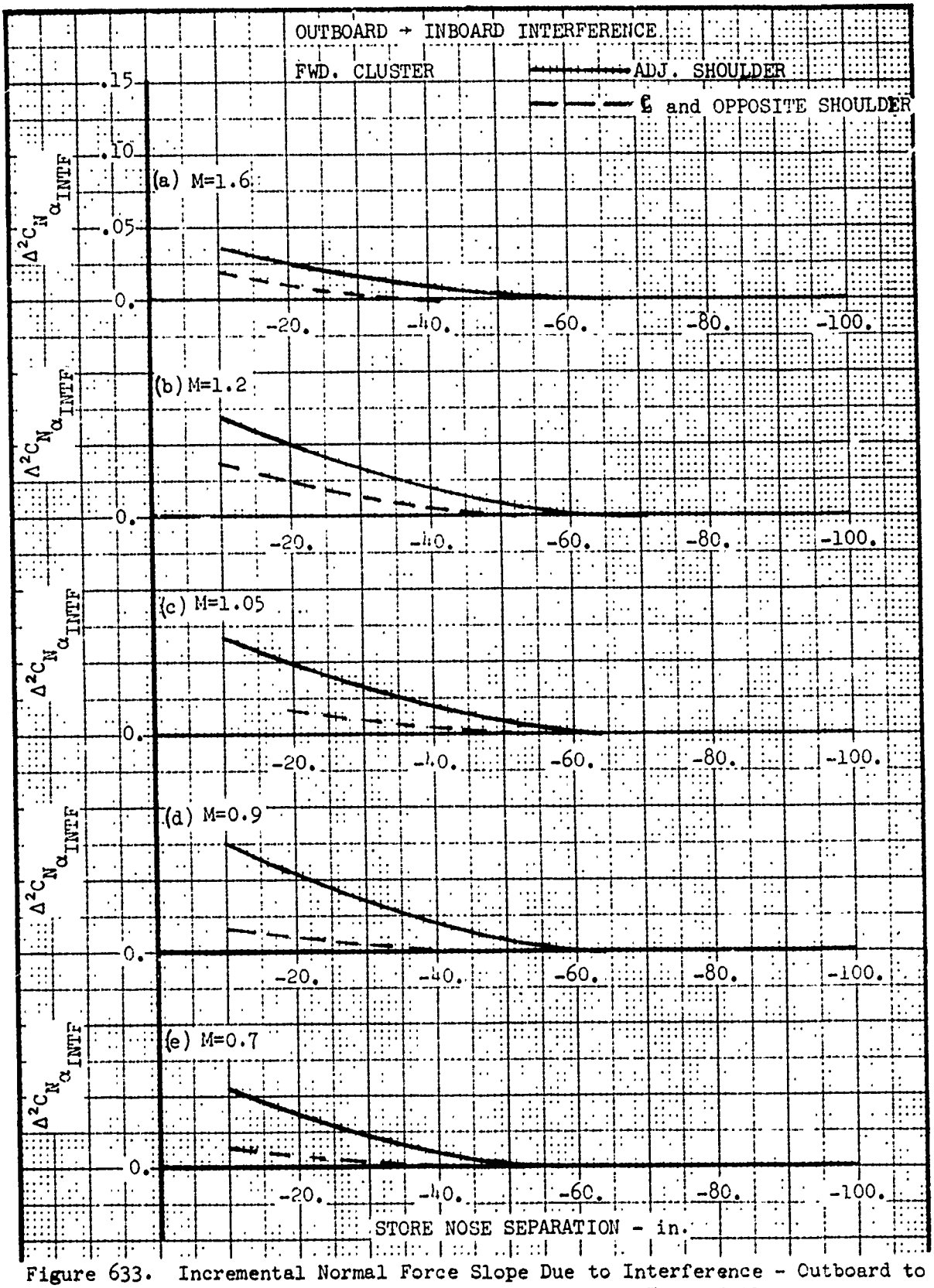


Figure 633. Incremental Normal Force Slope Due to Interference - Outboard to Inboard Interference Correction for the Forward Cluster

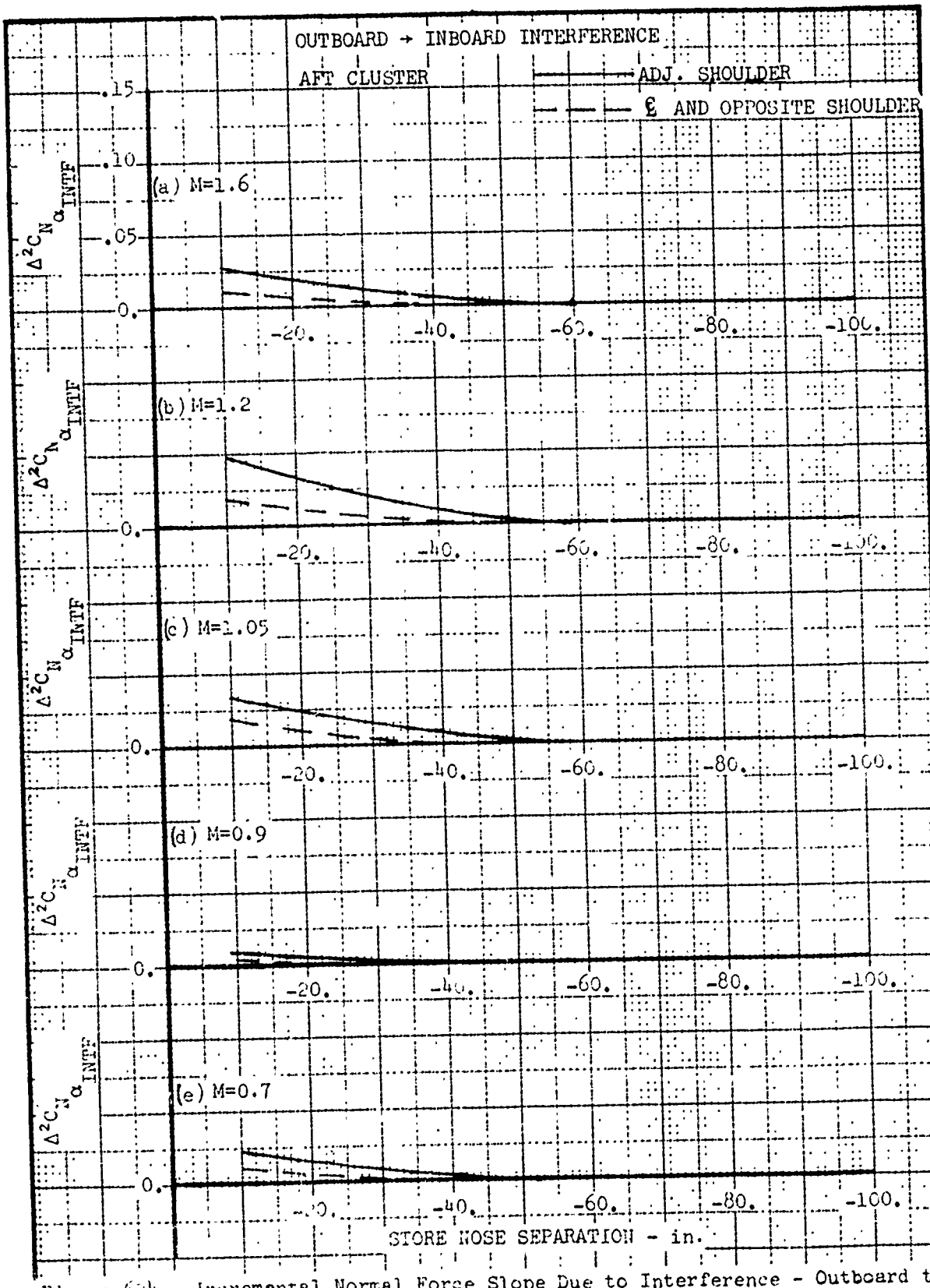


Figure 63h. Incremental Normal Force Slope Due to Interference - Outboard to Inboard Interference Correction for the Aft Cluster

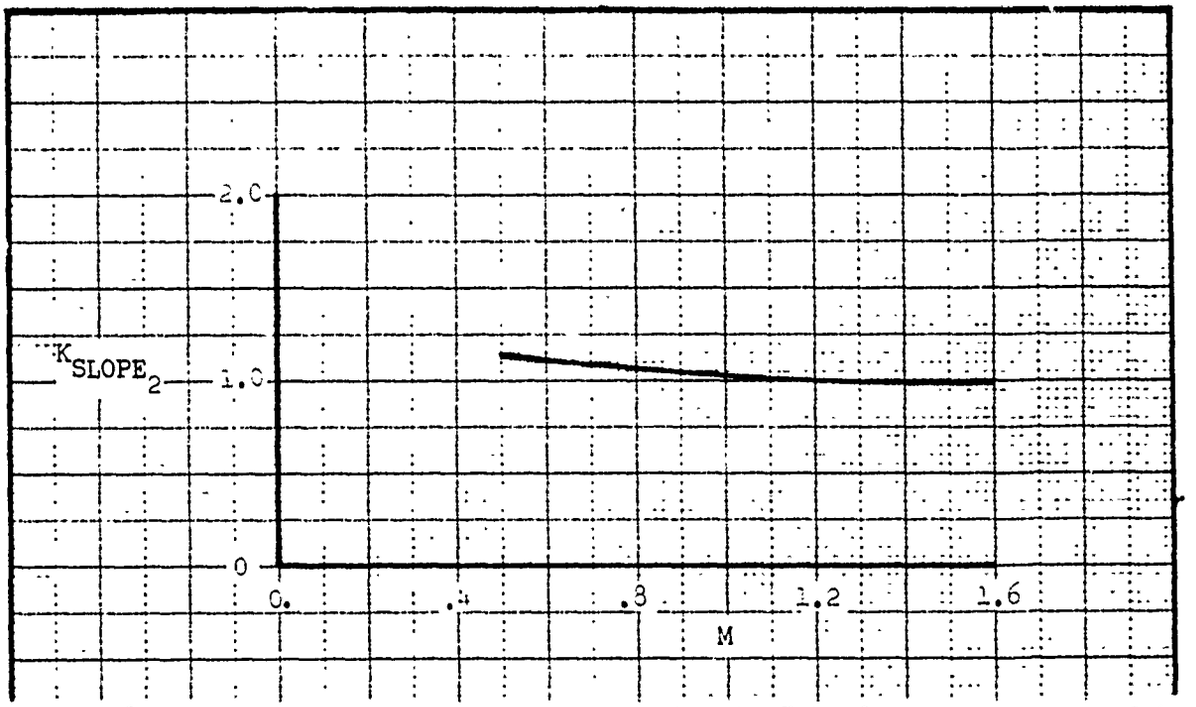


Figure 635. Incremental Normal Force Slope Due to Interference - K_{SLOPE_2} for Combination Inboard and Outboard Interference

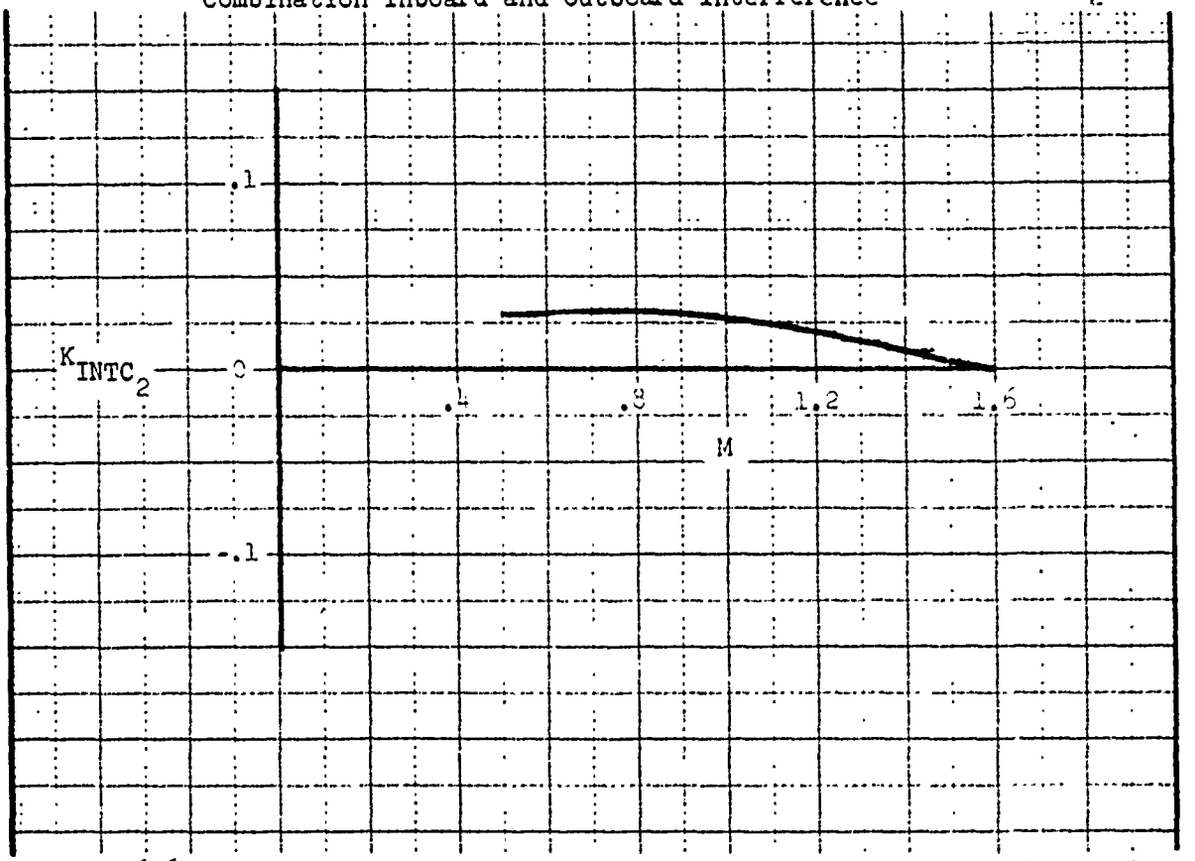


Figure 636. Incremental Normal Force Slope Due to Interference - K_{INTC_2} for Combination Inboard and Outboard Interference

4.3.3.2 Intercept Prediction

The equations governing the prediction of incremental normal force at $\alpha=0$ are presented below.

INTERFERING STORES CARRIED INBOARD

MER STATIONS 1,2,3,4,5, and 6 (MS1-6):

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ INTF \\ MS1-6}} = \left(\sum \Delta C_{N_{\substack{\alpha=0 \\ INTF \\ IB\rightarrow OB \\ MS1-6}}}\right) K_{SCALE_{NF}}$$

where:

$\Delta C_{N_{\substack{\alpha=0 \\ INTF \\ IB\rightarrow OB}}}$ - Incremental normal force intercept coefficient due to inboard to outboard interference as a function of y_{INTF}, see Table 18.

$K_{SCALE_{NF}}$ - Normal force scale factor, ft^2, see Section IV.

INTERFERING STORES CARRIED OUTBOARD

MER STATIONS 1,2,3,4,5, and 6 (MS1-6):

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ INTF \\ MS1-6}} = \left(\sum \Delta C_{N_{\substack{\alpha \\ INTF \\ OB\rightarrow IB \\ MS1-6}}} + \sum \Delta^2 C_{N_{\substack{\alpha=0 \\ INTF \\ MS1-6}}}\right) K_{SCALE_{NF}}$$

where:

$\Delta C_{N_{\substack{\alpha=0 \\ INTF \\ OB\rightarrow IB}}}$ - Incremental normal force intercept coefficient due to outboard to inboard interference as a function of y_{INTF}, see Table 18.

$\Delta^2 C_{N_{\substack{\alpha=0 \\ INTF}}}$ - Increment to $\Delta C_{N_{\substack{\alpha=0 \\ INTF \\ OB\rightarrow IB}}}$ as a function of store nose separation, $\sqrt{x^2_{INTF} + y^2_{INTF}}$ (see Subsection 3.1.3), which is assumed to be negative when the interfering store is aft of the subject captive store.

MER STA 1 - Figure 653
MER STA 2 - Figure 652
MER STA 3 - Figure 653
MER STA 4 - Figure 652
MER STA 5 - Figure 653
MER STA 6 - Figure 652

$K_{SCALE_{NF}}$ - Normal force scale factor, ft^2 , see Section IV.

INTERFERING STORES CARRIED INBOARD AND OUTBOARD

MER STATIONS 1,2,3,4,5 and 6 (MS1-6):

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{NF}{q}\right)_{\substack{\alpha=0 \\ INTF \\ MS1-6}} = \left[K_{INTC_1} + K_{SLOPE_1}\left(\sum \Delta C_{N_{\substack{\alpha=0 \\ INTF \\ IB\rightarrow OB \\ MS1-6}}} + \sum \Delta C_{N_{\substack{\alpha=0 \\ INTF \\ OB\rightarrow IB \\ MS1-6}}} + \sum \Delta^2 C_{N_{\substack{\alpha=0 \\ INTF \\ MS1-6}}}\right)\right] K_{SCALE_{NF}}$$

where:

K_{INTC_1} - Intercept for the inboard-outboard interference combination correction for normal force intercept, Figure 655.

K_{SLOPE_1} - Slope for the inboard-outboard interference combination correction for normal force intercept, Figure 654.

$\Delta C_{N_{\substack{\alpha=0 \\ INTF \\ IB \rightarrow OB}}}$ - Previously defined.

$\Delta C_{N_{\substack{\alpha=0 \\ INTF \\ OB \rightarrow IB}}}$ - Previously defined.

$\Delta^2 C_{N_{\substack{\alpha=0 \\ INTF}}}$ - Previously defined.

$K_{SCALE_{NF}}$ - Normal force scale factor, ft^2 , see Section IV.

The above equations define the interference increment calculation at a given Mach number. For Mach numbers other than those presented, M = 0.7, 0.9, 1.05, 1.2, 1.6, these guidelines should be followed. If the subject Mach number is less than M = 0.7, use the value at M = 0.7. For other Mach numbers linear interpolation should be used between the Mach numbers which are presented.

TABLE 18. INCREMENTAL NORMAL FORCE INTERCEPT COEFFICIENT DUE TO INTERFERENCE - FIGURE LOCATION GUIDE

$\Delta C_{N_{\alpha=0}}$ INTF	MACH NUMBER 0.7	0.9	1.05	1.2	1.6
	Figure Numbers				
Adj. Shoulder-Fwd. Cluster	637	638	639	640	641
Adj. Shoulder-Aft Cluster	637	638	639	640	641
℄ Store-Fwd. Cluster	642	643	644	645	646
℄ Store Aft Cluster	642	643	644	645	646
Opposite Shoulder-Fwd. Cluster	647	648	649	650	651
Opposite Shoulder-Aft Cluster	647	648	649	650	651

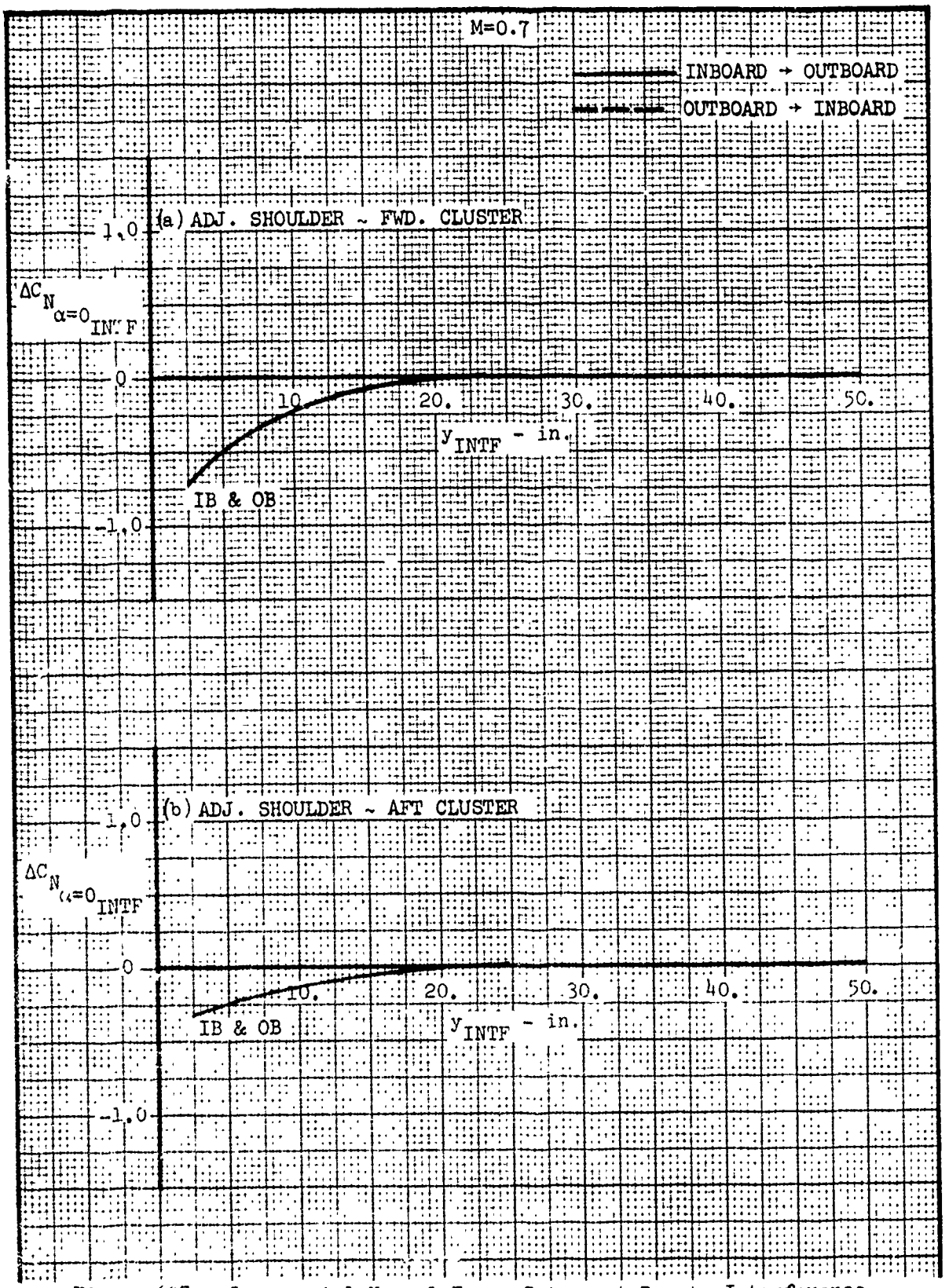


Figure 637. Incremental Normal Force Intercept Due to Interference - Adjacent Shoulder at M=0.7

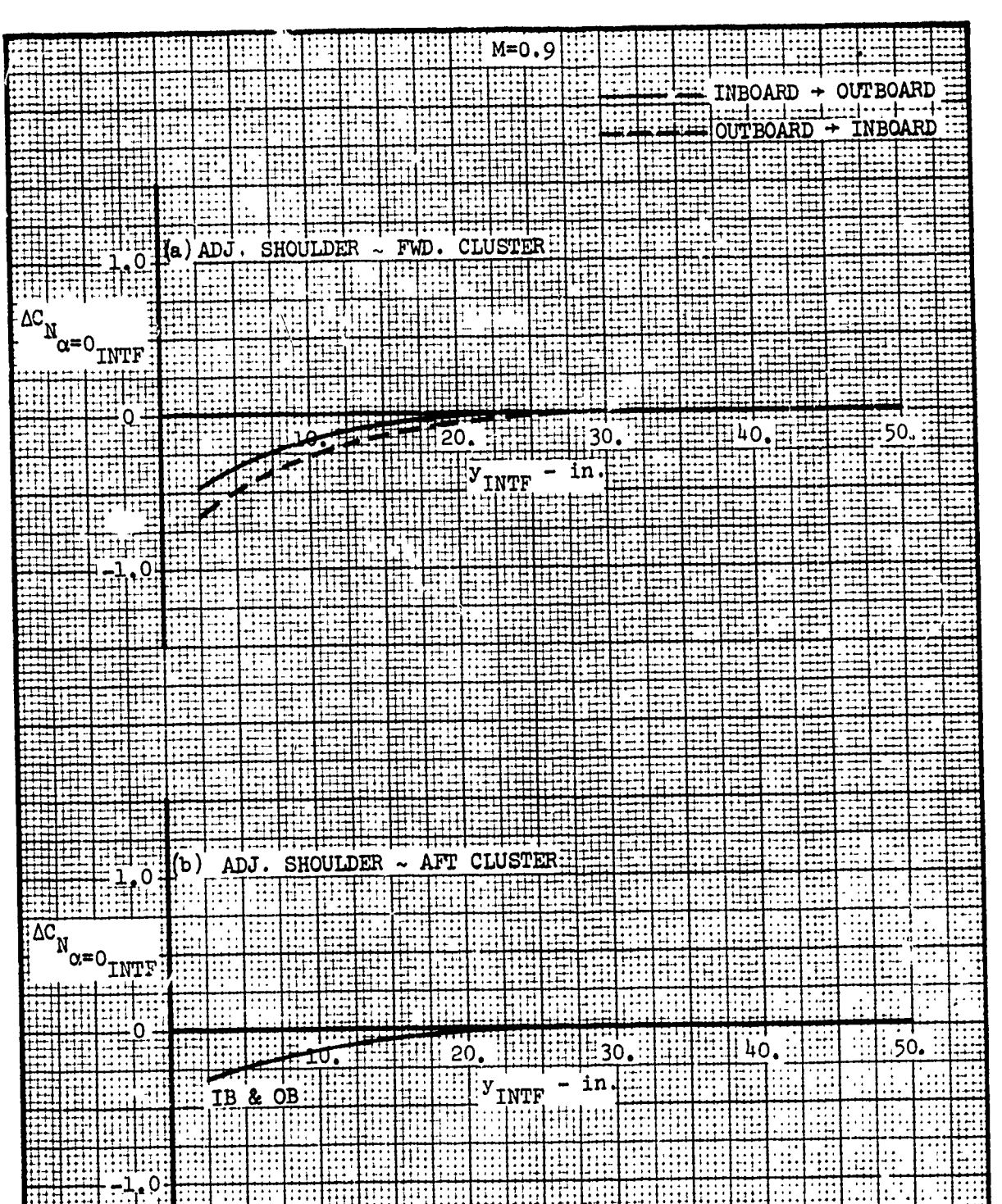


Figure 638. Incremental Normal Force Intercept Due to Interference - Adjacent Shoulder at M=0.9

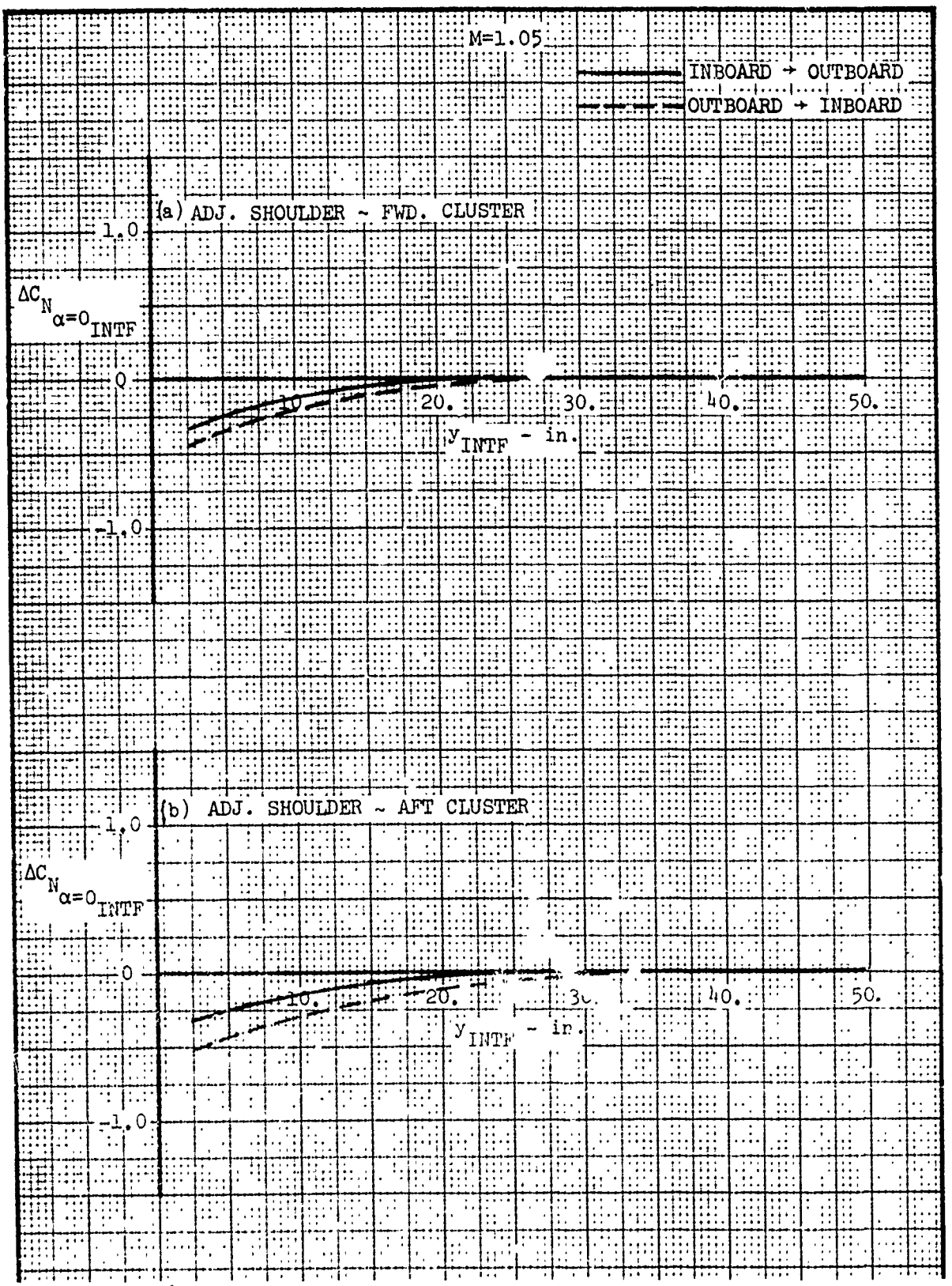


Figure 639. Incremental Normal Force Intercept Due to Interference - Adjacent Shoulder at M=1.05

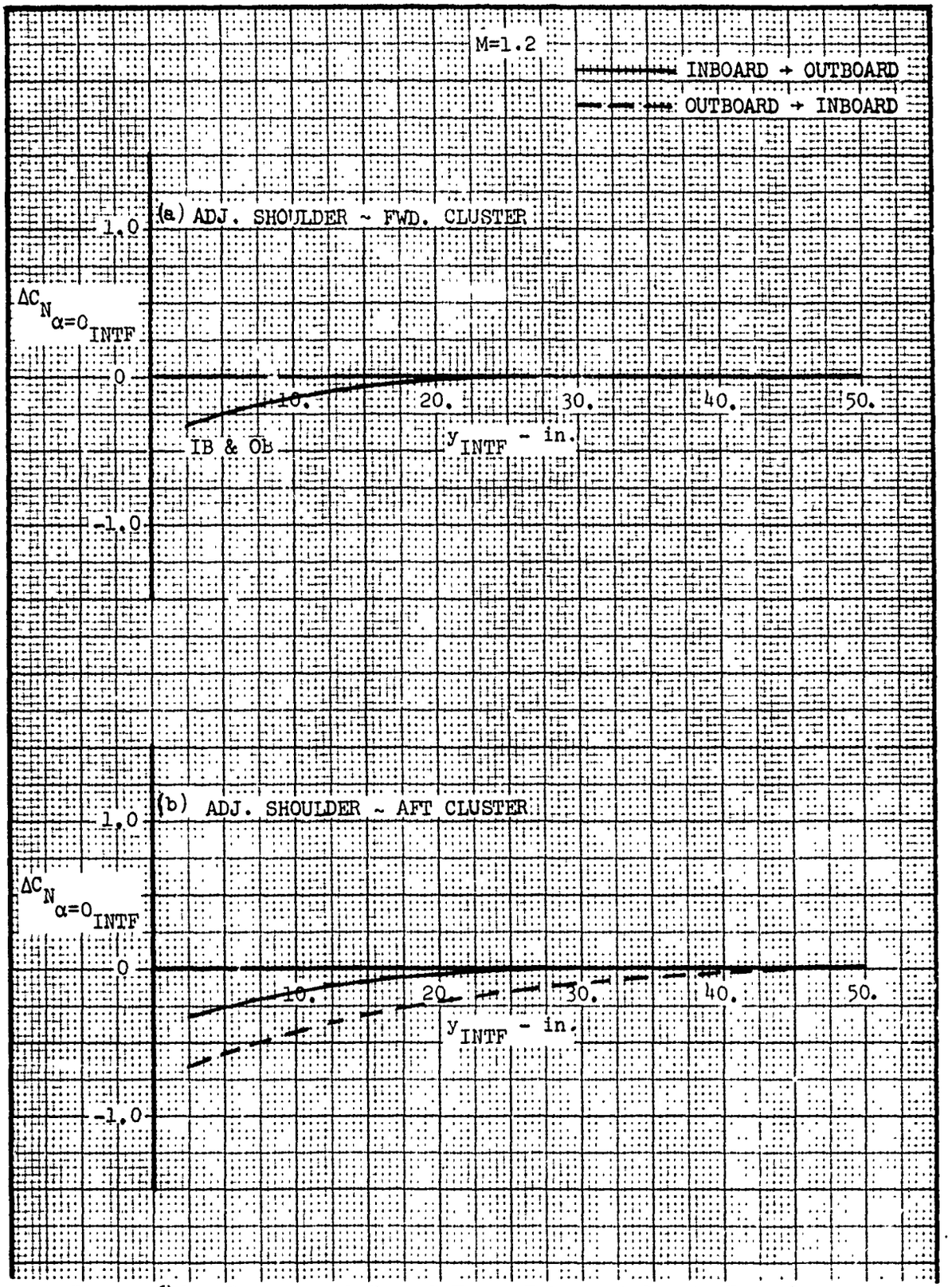


Figure 640. Incremental Normal Force Intercept Due to Interference - Adjacent Shoulder at M=1.2

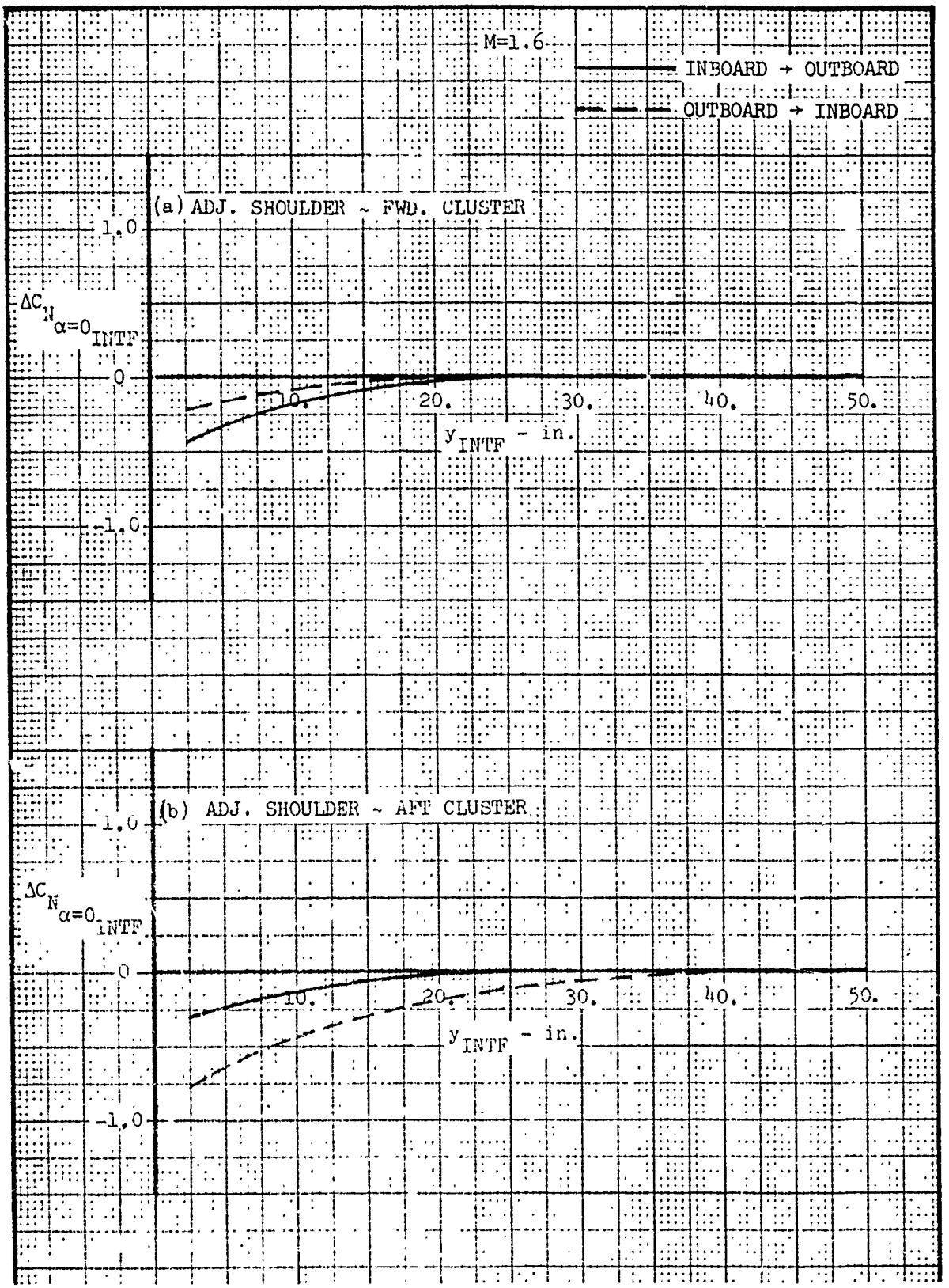


Figure 641. Incremental Normal Force Intercept Due to Interference - Adjacent Shoulder at M=1.6

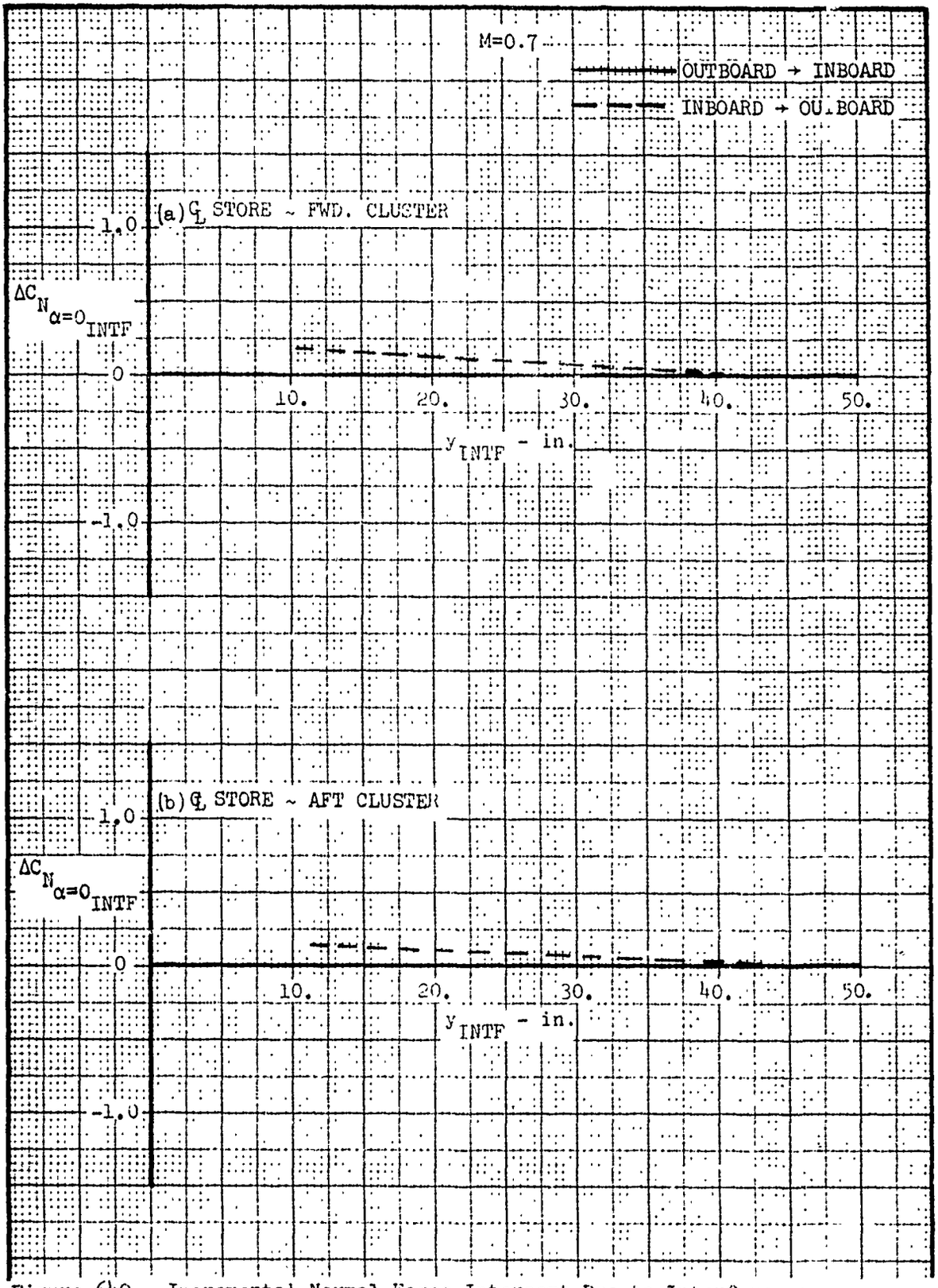


Figure 642. Incremental Normal Force Intercept Due to Interference - Centerline Store at M=0.7

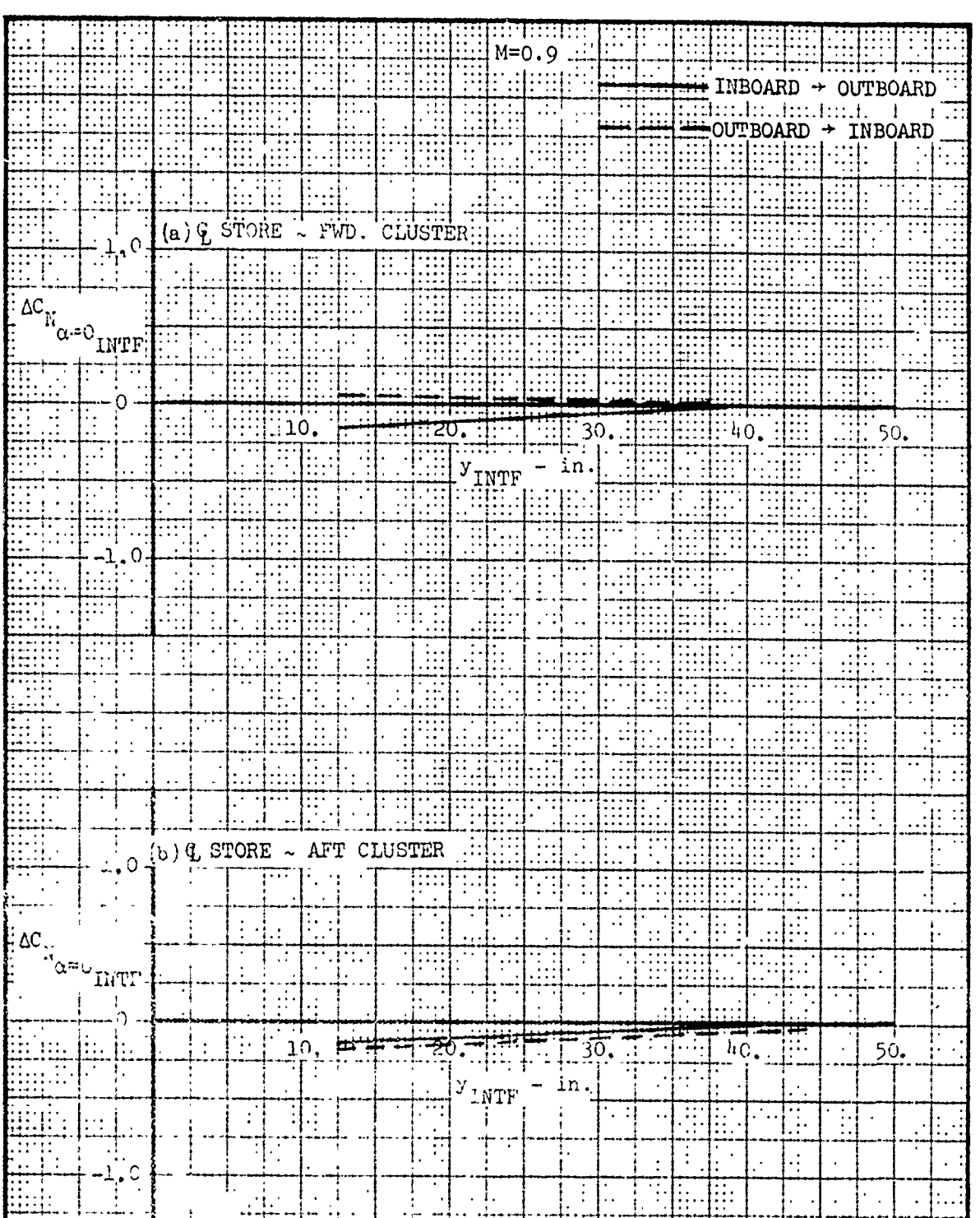


Figure 63. Incremental Normal Force Intercept Due to Interference - Centerline Store at M=0.9

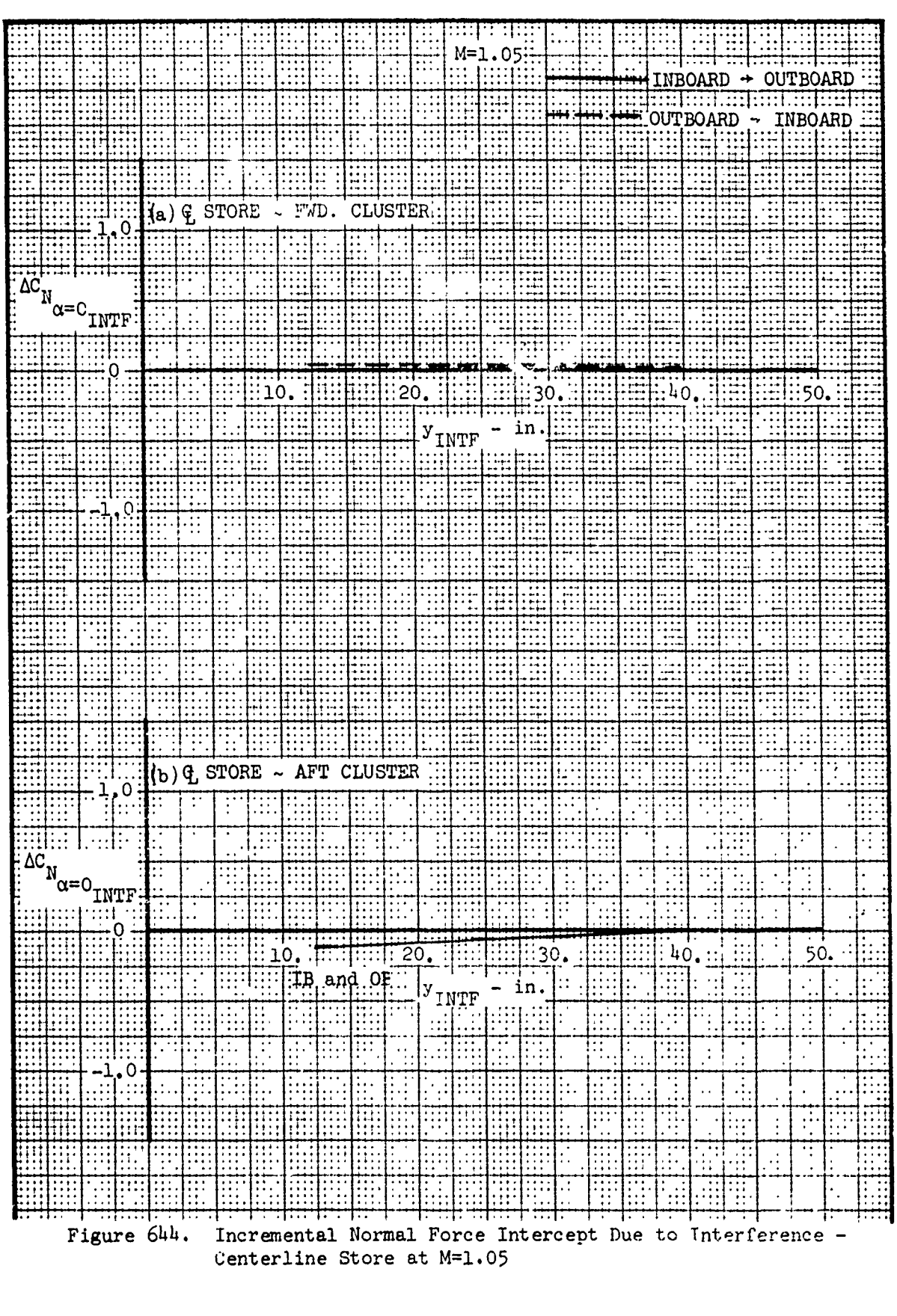


Figure 644. Incremental Normal Force Intercept Due to Interference - Centerline Store at M=1.05

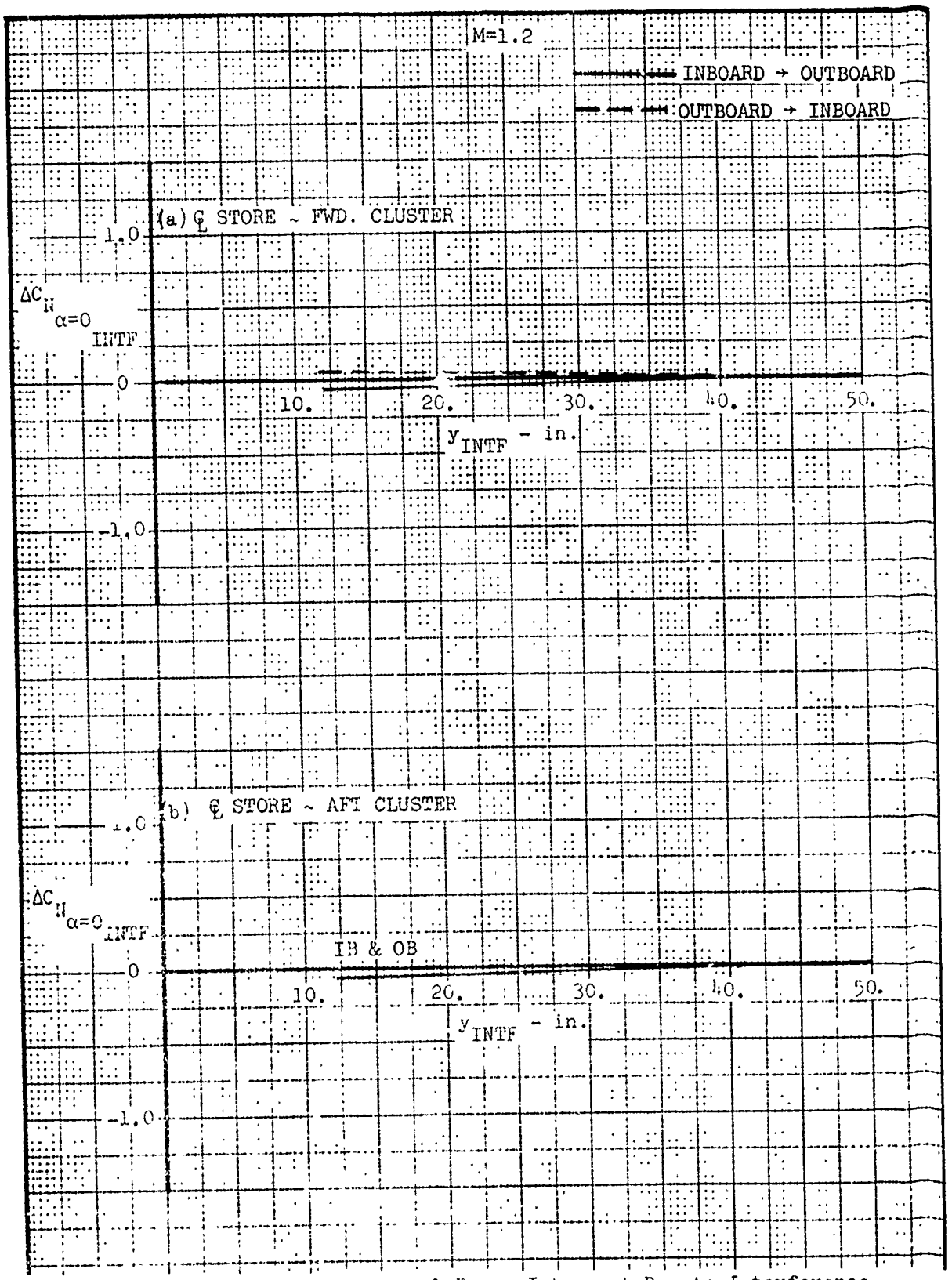


Figure 65. Incremental Normal Force Intercept Due to Interference - Centerline Store at M=1.2

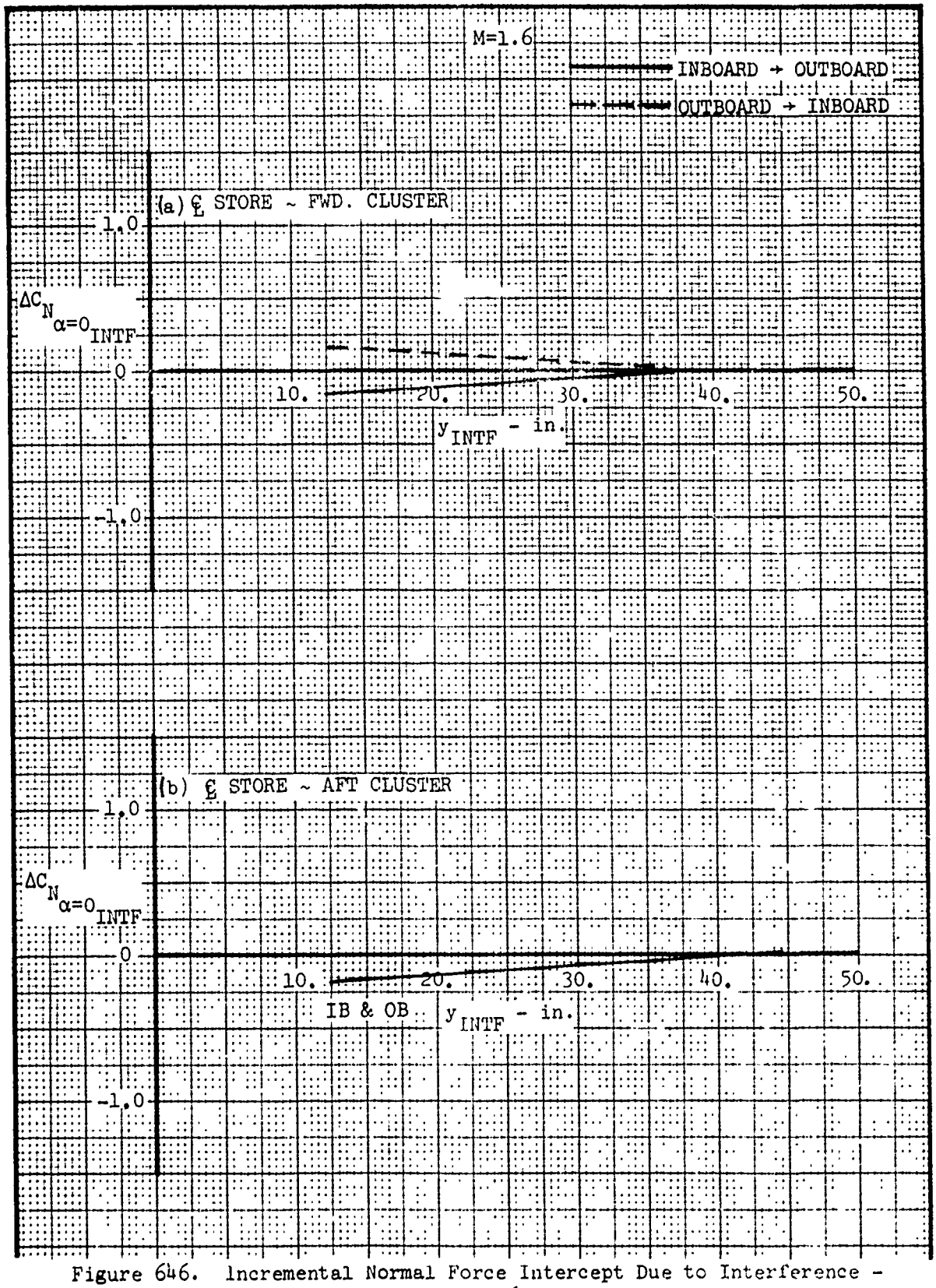


Figure 646. Incremental Normal Force Intercept Due to Interference - Centerline Store at M=1.6

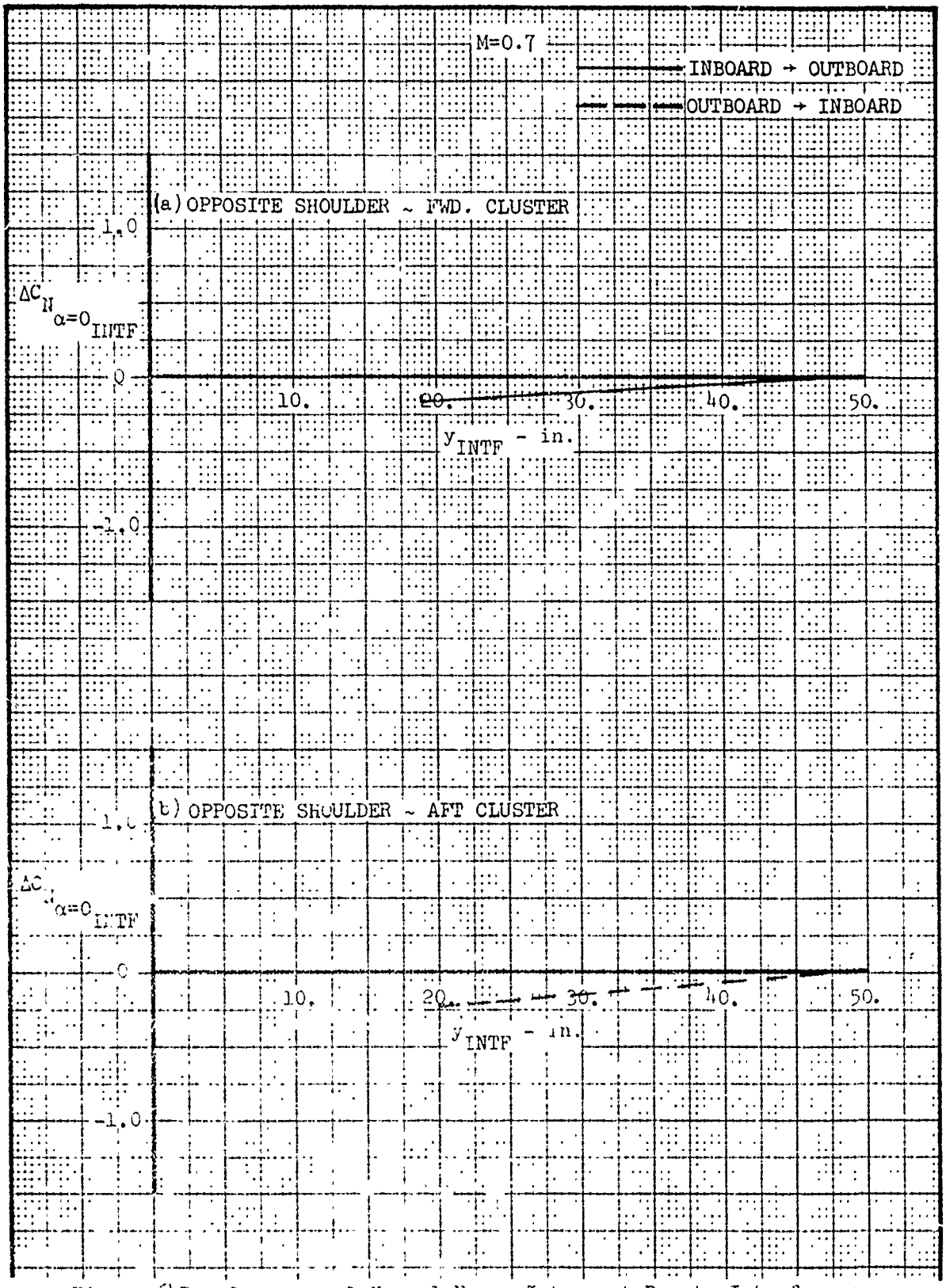


Figure 647. Incremental Normal Force Intercept Due to Interference - Opposite Shoulder at M=0.7

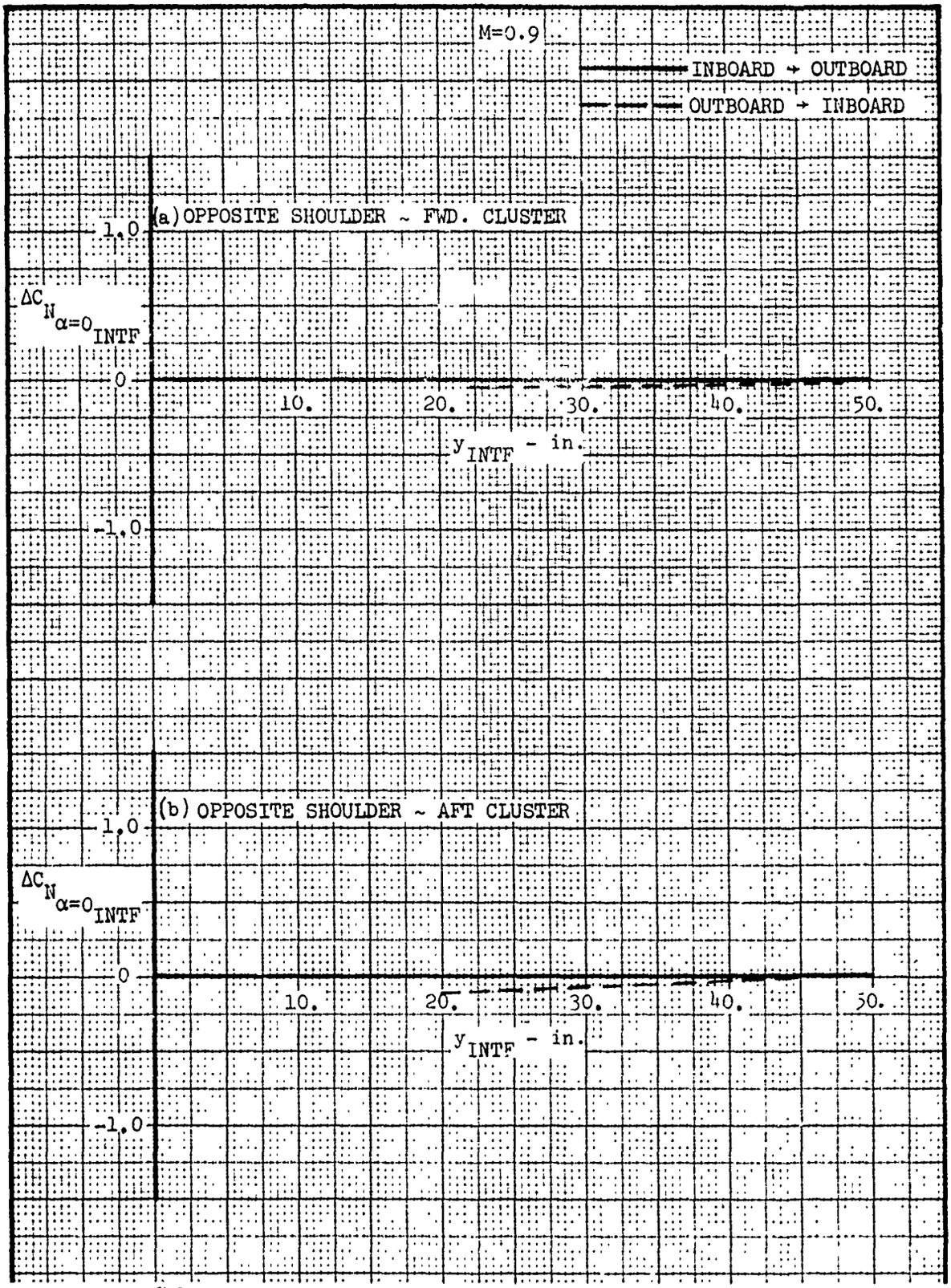


Figure 648. Incremental Normal Force Intercept Due to Interference - Opposite Shoulder at M=0.9

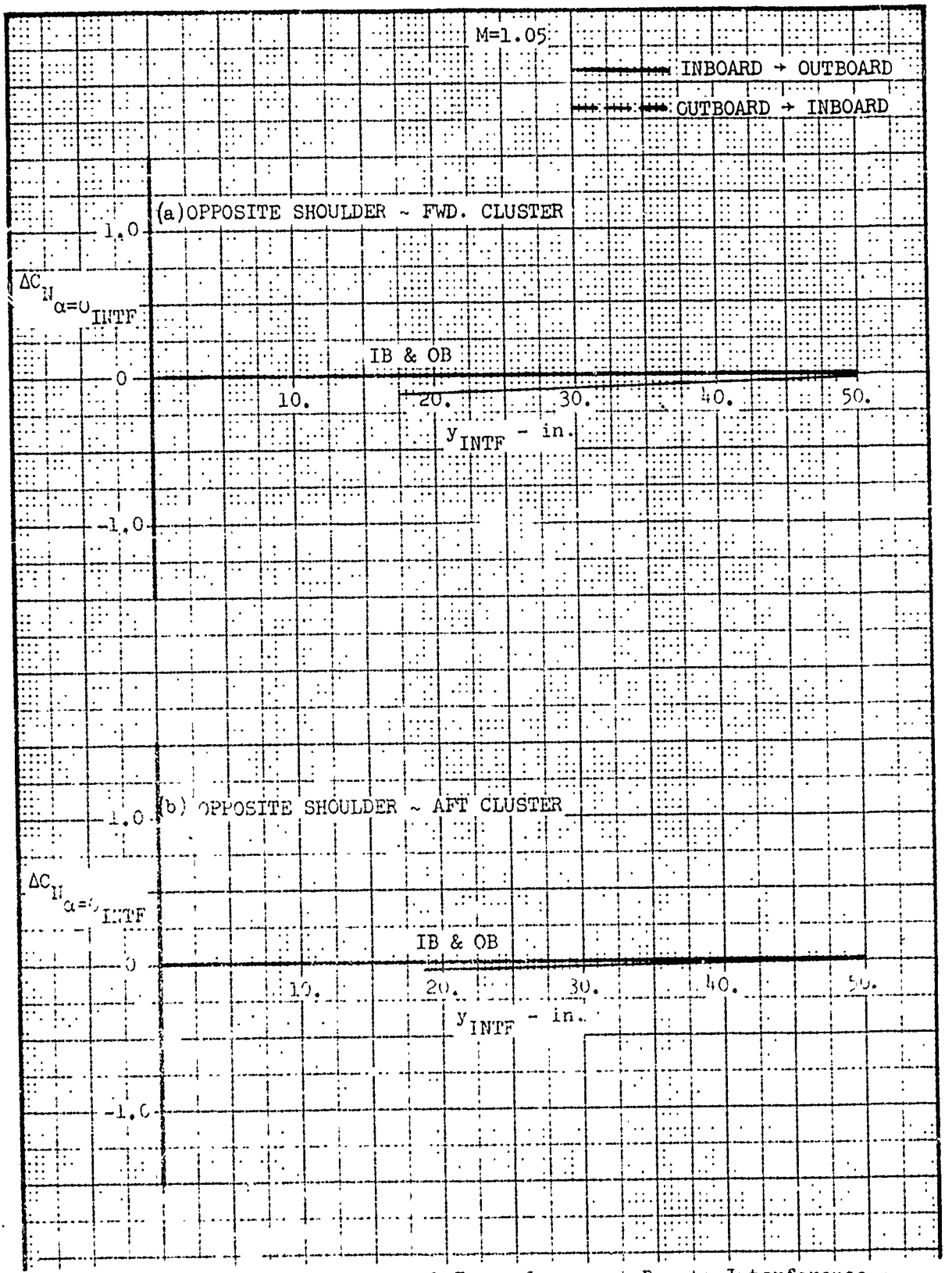


Figure 49. Incremental Normal Force Interc pt Due to Interference - Opposite Shoulder at M=1.05

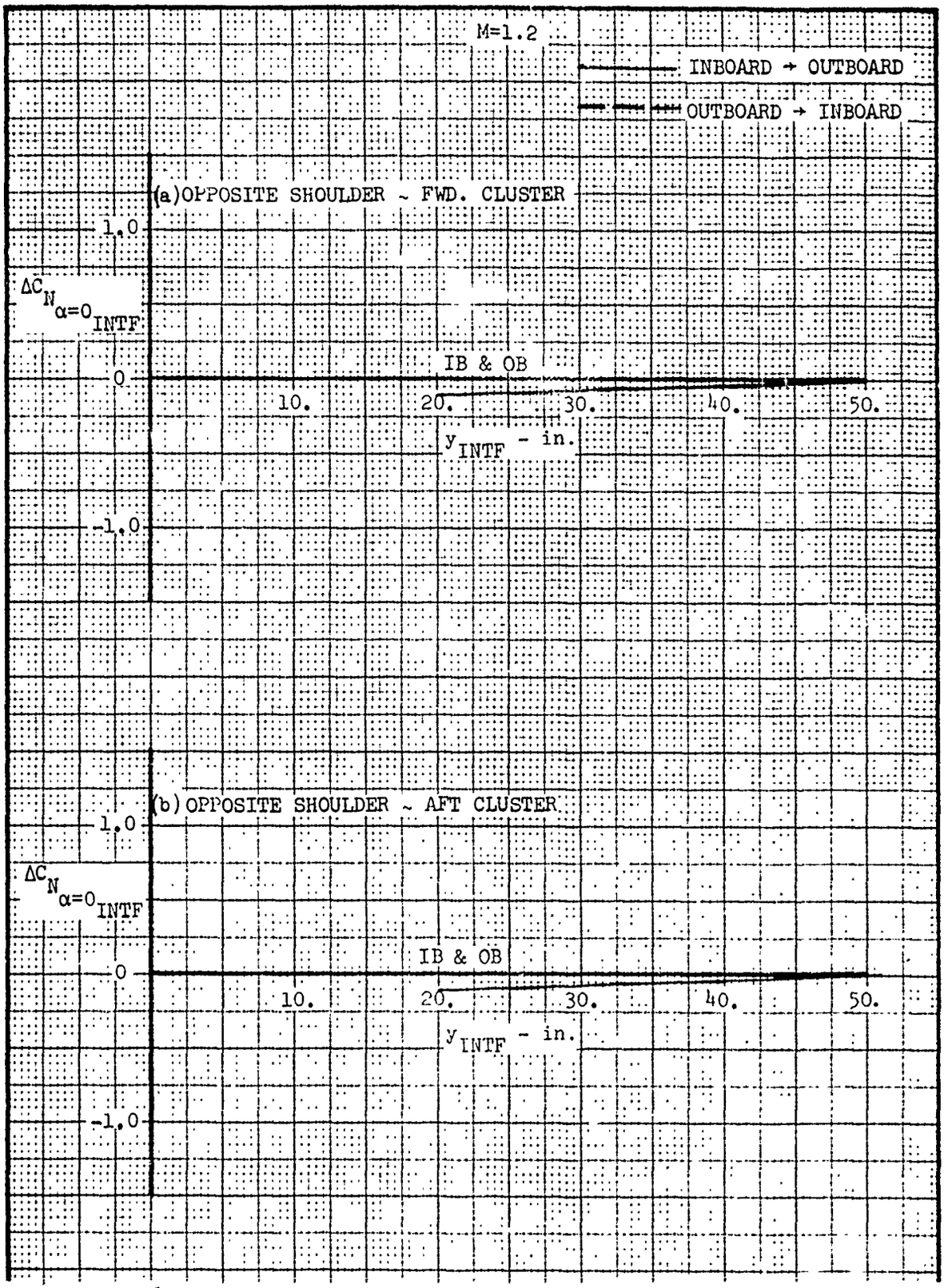


Figure 650. Incremental Normal Force Intercept Due to Interference - Opposite Shoulder at M=1.2

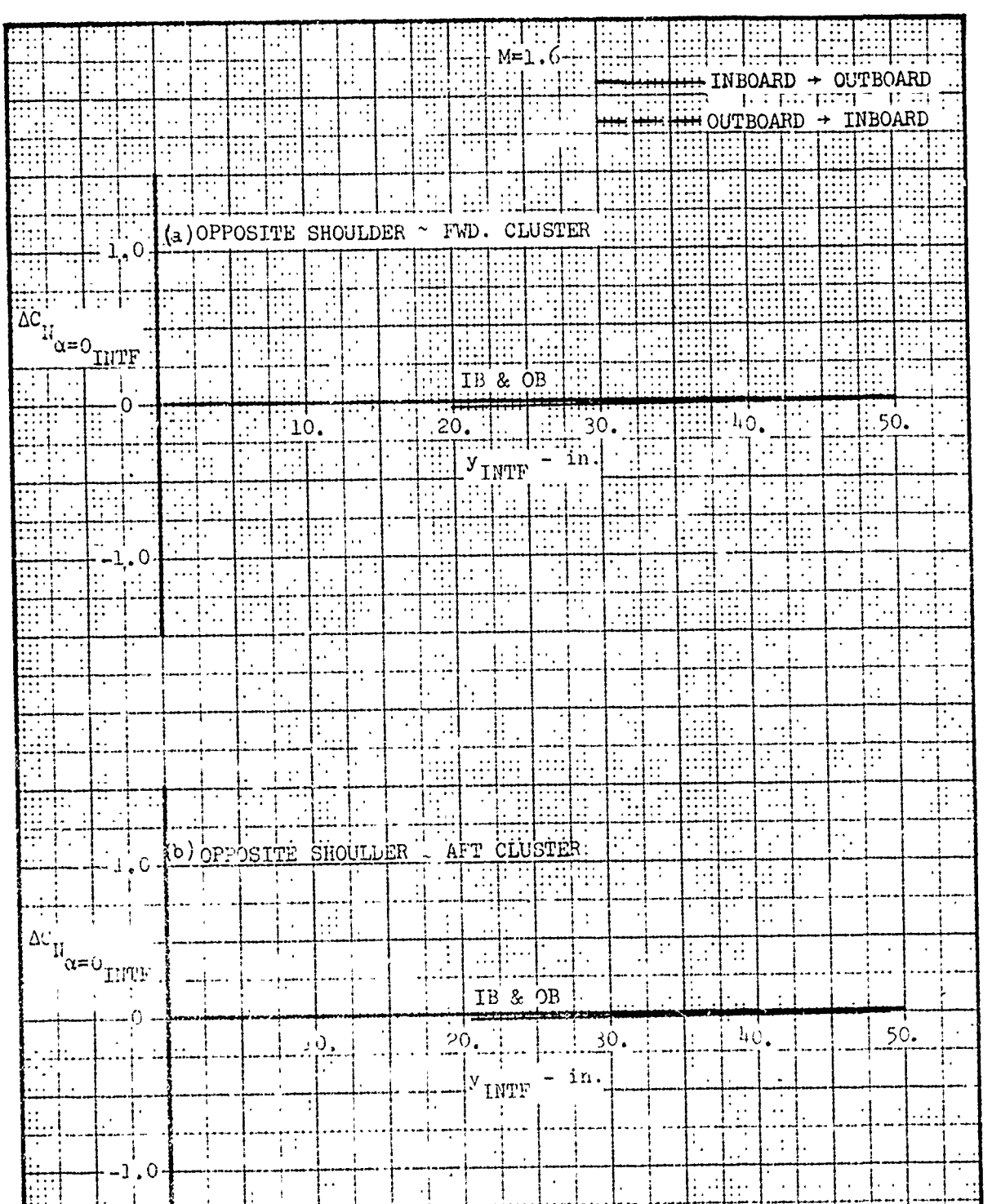


Figure 51. Incremental Normal Force Intercept Due to Interference - Opposite Shoulder at M=1.6

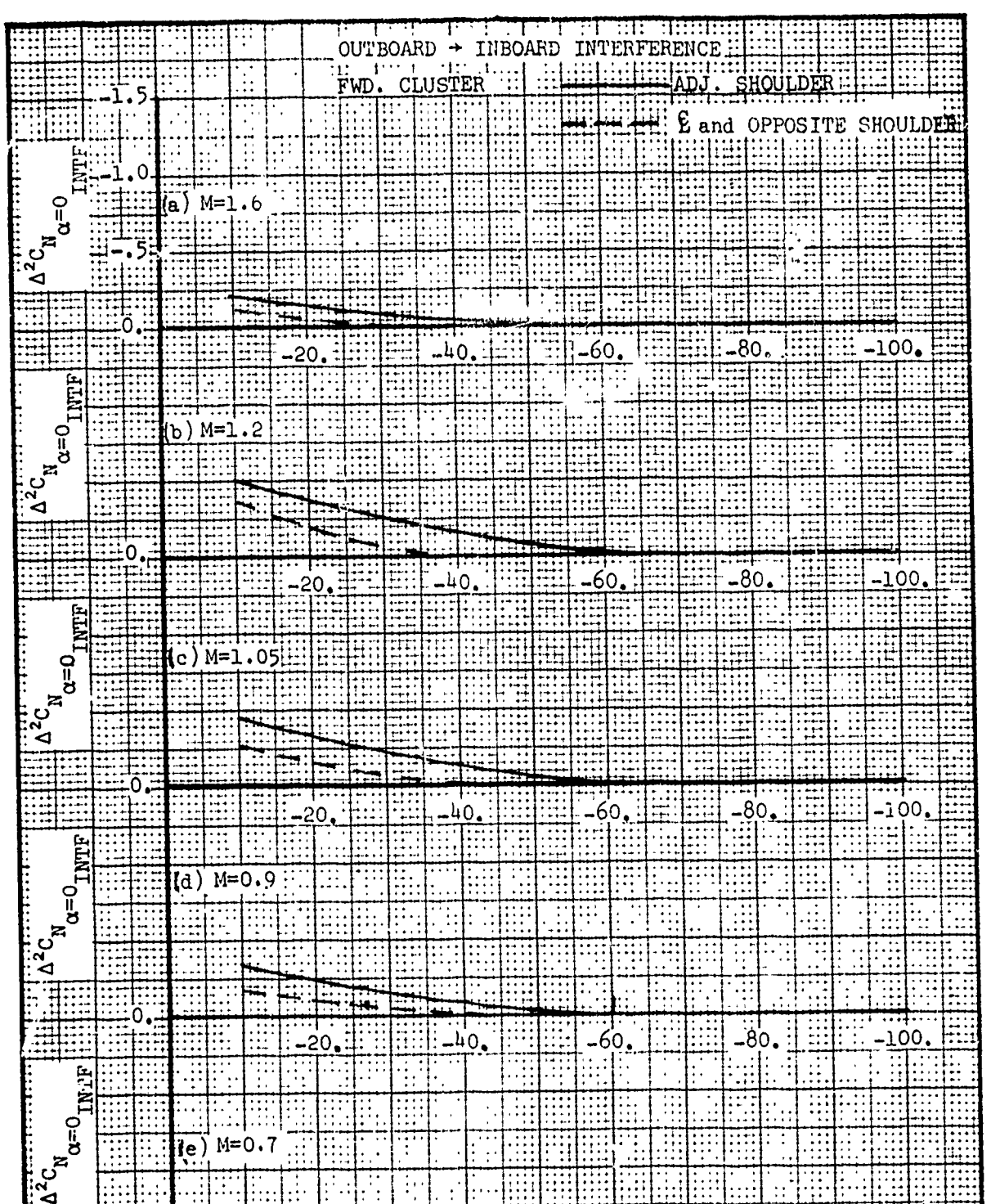


Figure 652. Incremental Normal Force Intercept Due to Interference - Outboard to Inboard Interference Correction for the Forward Cluster

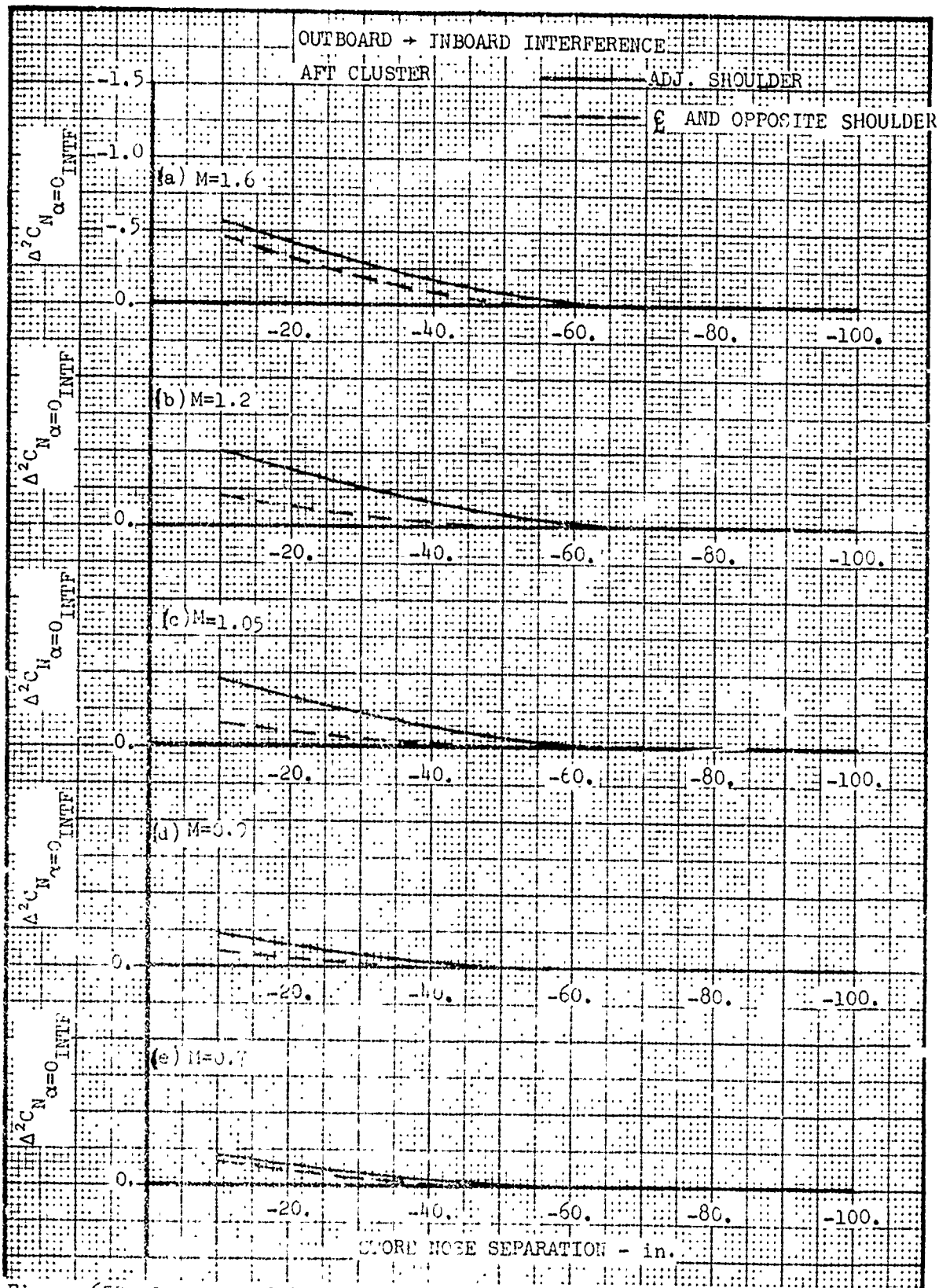


Figure 652. Incremental Normal Force Intercept Due to Interference - Outboard to Inboard Interference Correction for the Aft Cluster

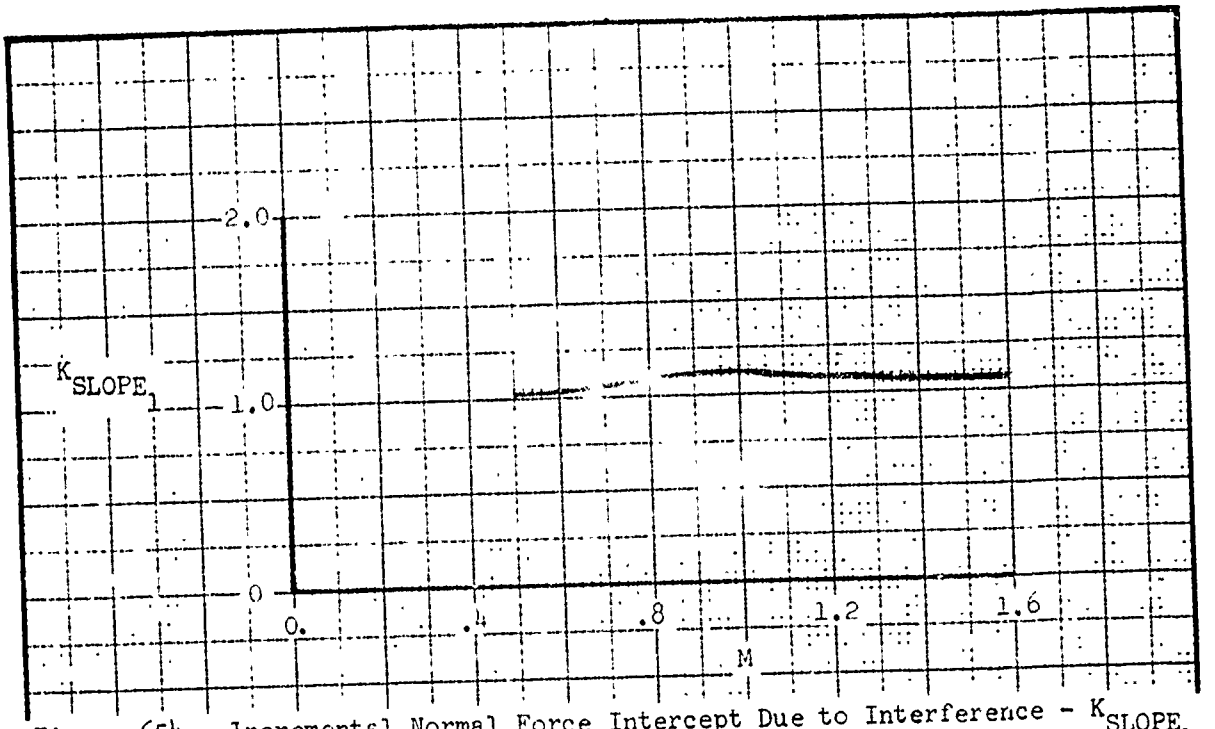


Figure 654. Incremental Normal Force Intercept Due to Interference - K_{SLOPE_1} for Combination Inboard and Outboard Interference

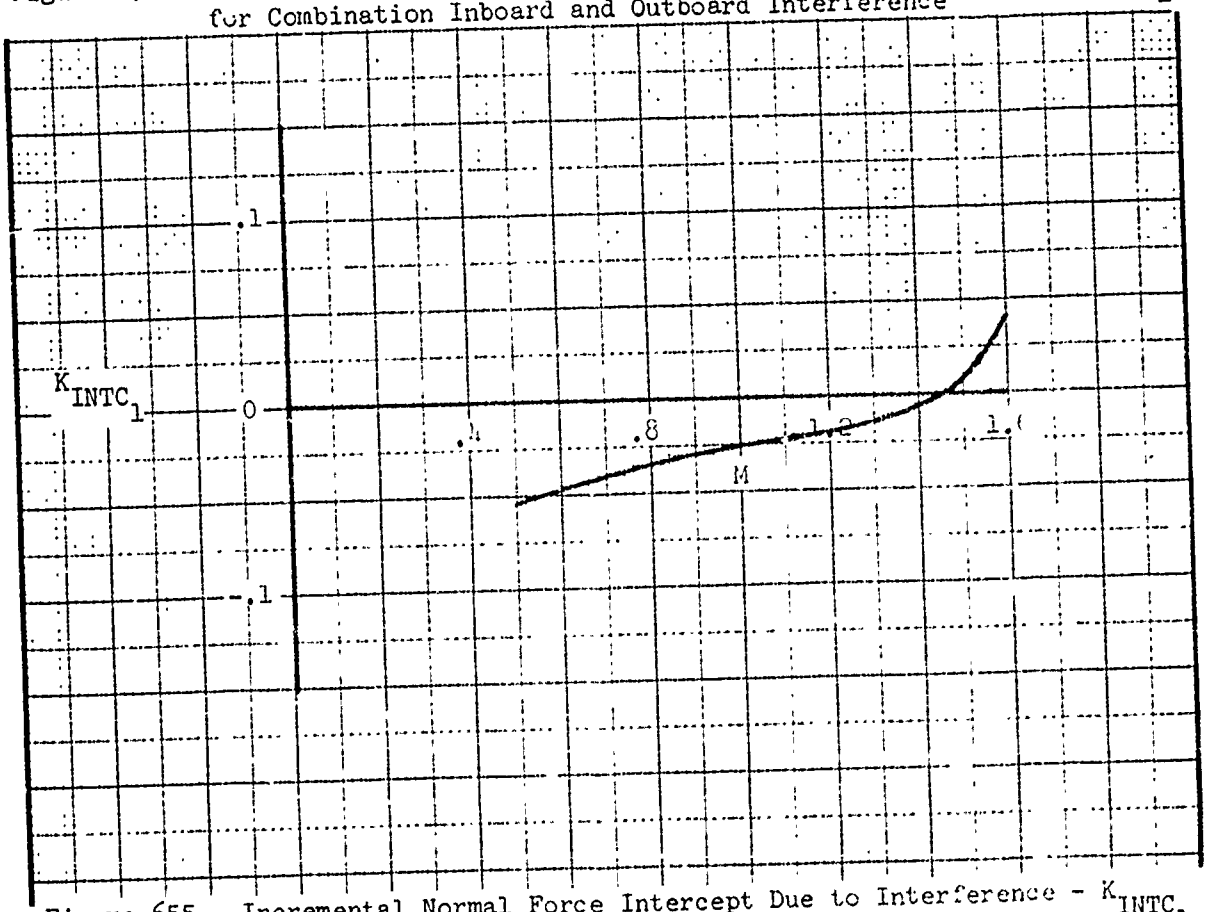


Figure 655. Incremental Normal Force Intercept Due to Interference - K_{INTC_1} for Combination Inboard and Outboard Interference

4.4 PITCHING MOMENT

4.4.1 Basic Airload

The basic pitching moment data were generated by a zero yaw pitch excursion of the parent aircraft. The data are referenced along the store centerline at the mid-lug location of each ejector unit. Under each subsection the prediction method is separated to apply to fuselage centerline-mounted stores and to wing pylon-mounted stores.

4.4.1.1 Slope Prediction

The variation of captive store pitching moment with angle of attack when installed on a MER at M=0.5 is defined by the following relationships.

FUSELAGE CENTERLINE-MOUNTED STORES

MER Stations 1, 2, 3, 4, 5 and 6 (MS1-6):

$$\left(\frac{PM}{q}\right)_{\substack{\alpha \\ PRED \\ MS1-6}} = \left(\frac{PM}{q}\right)_{\substack{\alpha_{\ell} \\ \ell \\ MS1-6}} = f(d)$$

where:

$\left(\frac{PM}{q}\right)_{\alpha_{\ell}}$ - Fuselage centerline captive store pitching moment variation with angle of attack, $\frac{ft^3}{deg}$, presented as a function of store diameter.

MER STA 1 - Figure 656
MER STA 2 - Figure 656
MER STA 3 - Figure 657
MER STA 4 - Figure 657
MER STA 5 - Figure 657
MER STA 6 - Figure 657

WING-MOUNTED STORES

MER Stations [illegible] and [illegible]:

$$\left(\frac{PM}{q}\right)_{\substack{\alpha \\ PRED \\ MS1-6}} = K_{\alpha_{\ell}} K_{\substack{C_{PM} \\ M}} \left(\frac{NF}{q}\right)_{\substack{\alpha \\ \ell}} + \left(\frac{PM}{q}\right)_{\substack{\alpha \\ BUOY \\ MS1-6}}$$

and

$$\left(\frac{PM}{q}\right)_{\alpha_{BUOY_{MS1,2}}} = \frac{PPA}{629.2}\left(C_{m_\alpha}{}_{BUOY_{MS1,2}} + \Delta C_{m_\alpha}{}_{BUOY_{MS1,2}} \right)$$

where:

$K_{C_{PM}}\left(\frac{NF}{q}\right)_{\alpha_{ISO}}$ - Initial pitching moment prediction, $\frac{ft.^3}{deg.}$, see Subsection 2.3.3. Note different K_{NOSE} factor between MS1 and MS2.

K_{Λ_2} - Aircraft wing sweep correction factor based on the sweep angle, Λ, of the quarter-chord, $\frac{\cos \Lambda}{\cos 45^\circ}$.

PPA - Total plan projected area, $in.^2$, see Subsection 2.2.2.

$C_{m_\alpha}{}_{BUOY}$ - Pitching moment buoyancy based on local wing chord, $\frac{1}{deg.}$.

MER STA 1 - Figure 658
MER STA 2 - Figure 658

$\Delta C_{m_\alpha}{}_{BUOY}$ - Incremental pitching moment buoyancy correction based on $\frac{\ell_{LE_F}}{C_{LOCAL}}$, $\frac{1}{deg.}$, Figure 659

MER Stations 3,4,5, and 6 (MS3-6):

$$\left(\frac{PM}{q}\right)_{\alpha_{PRED_{MS3-6}}} = K_{\Lambda_2} K_{C_{PM_{MS1\ MS2}}} \left(\frac{NF}{q}\right)_{\alpha_{ISO}} + K_{SCALE_{PM}} \Delta C_{m_{\alpha_{MS3,5\ MS4,6}}}$$

where:

$K_{C_{PM}}\left(\frac{NF}{q}\right)_{\alpha_{ISO}}$ - Initial pitching moment prediction, $\frac{ft^3}{deg}$, see Subsection 2.3.3. $K_{C_{PM}}$ to be used should be MS1 for MS3,5 and MS2 for MS4, 6.

K_{Λ_2} - Aircraft wing sweep correction factor, $\frac{\cos \Lambda}{\cos 45^\circ}$.

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

ΔC_{m_α} - Incremental pitching moment coefficient for the shoulder stations, $\frac{1}{deg}$.

MER STA 3 - Figure 660

MER STA 5 - Figure 660

MER STA 4 - Figure 661

MER STA 6 - Figure 661

A numerical example of a similar computational procedure is included in Subsection 4.2.1.1. Note, however, that the buoyancy term must be included for wing-mounted stores on MER Stations 1 and 2.

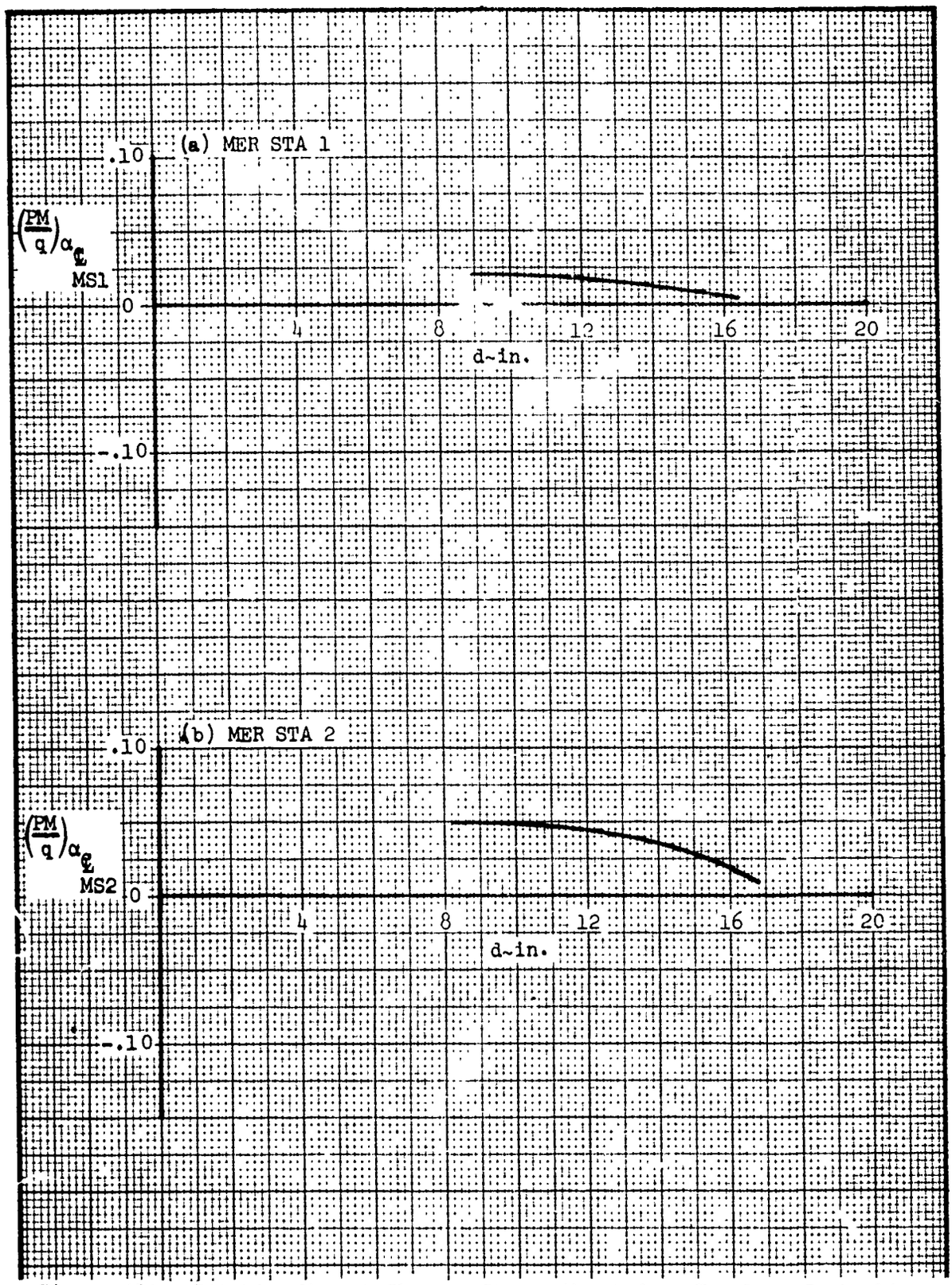


Figure 656. Pitching Moment Slope - Stores Mounted on Fuselage Centerline, MER Stations 1 and 2

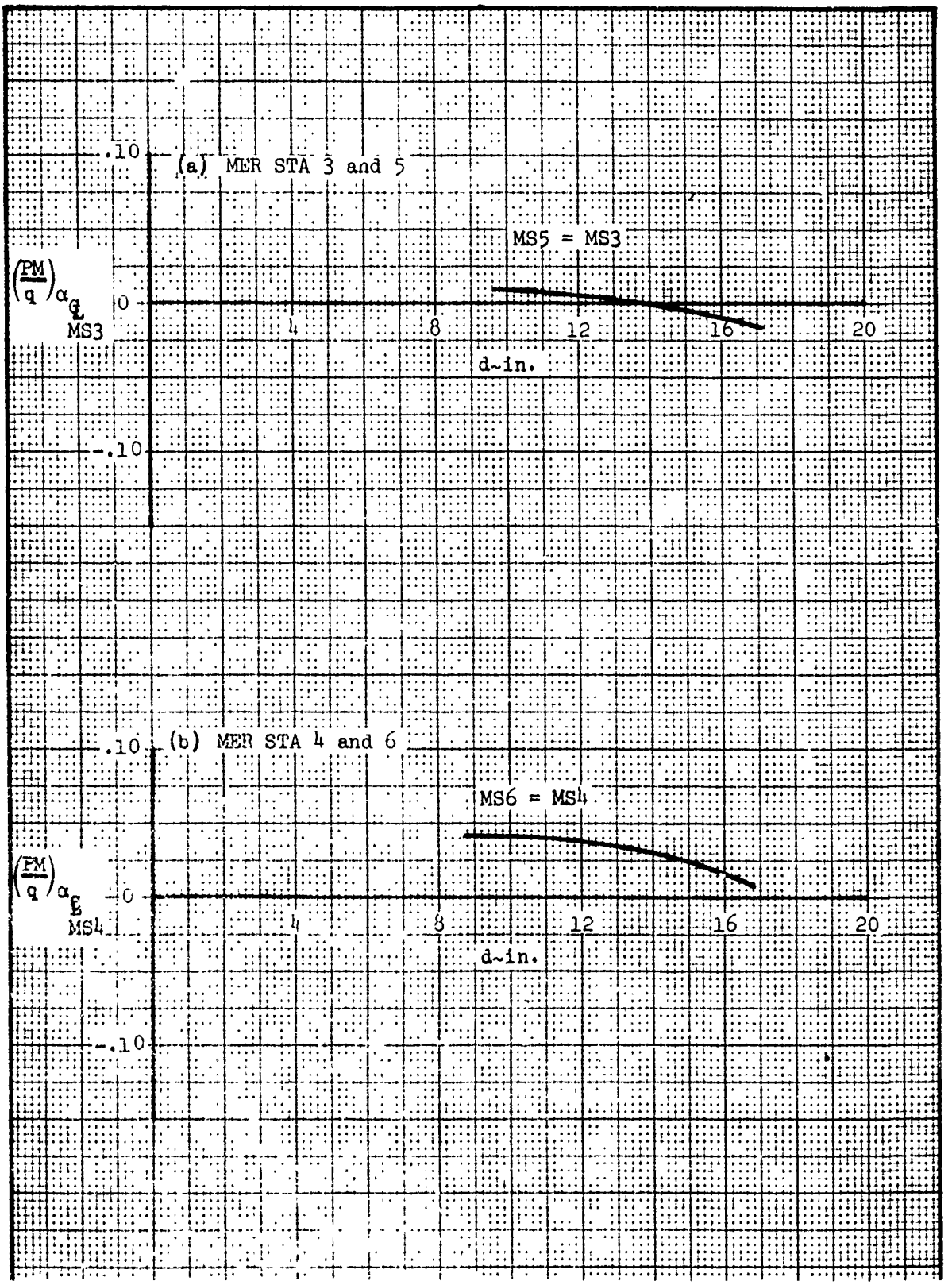


Figure 657. Pitching Moment Slope - Stores Mounted on Fuselage Centerline, MER Stations 3-6

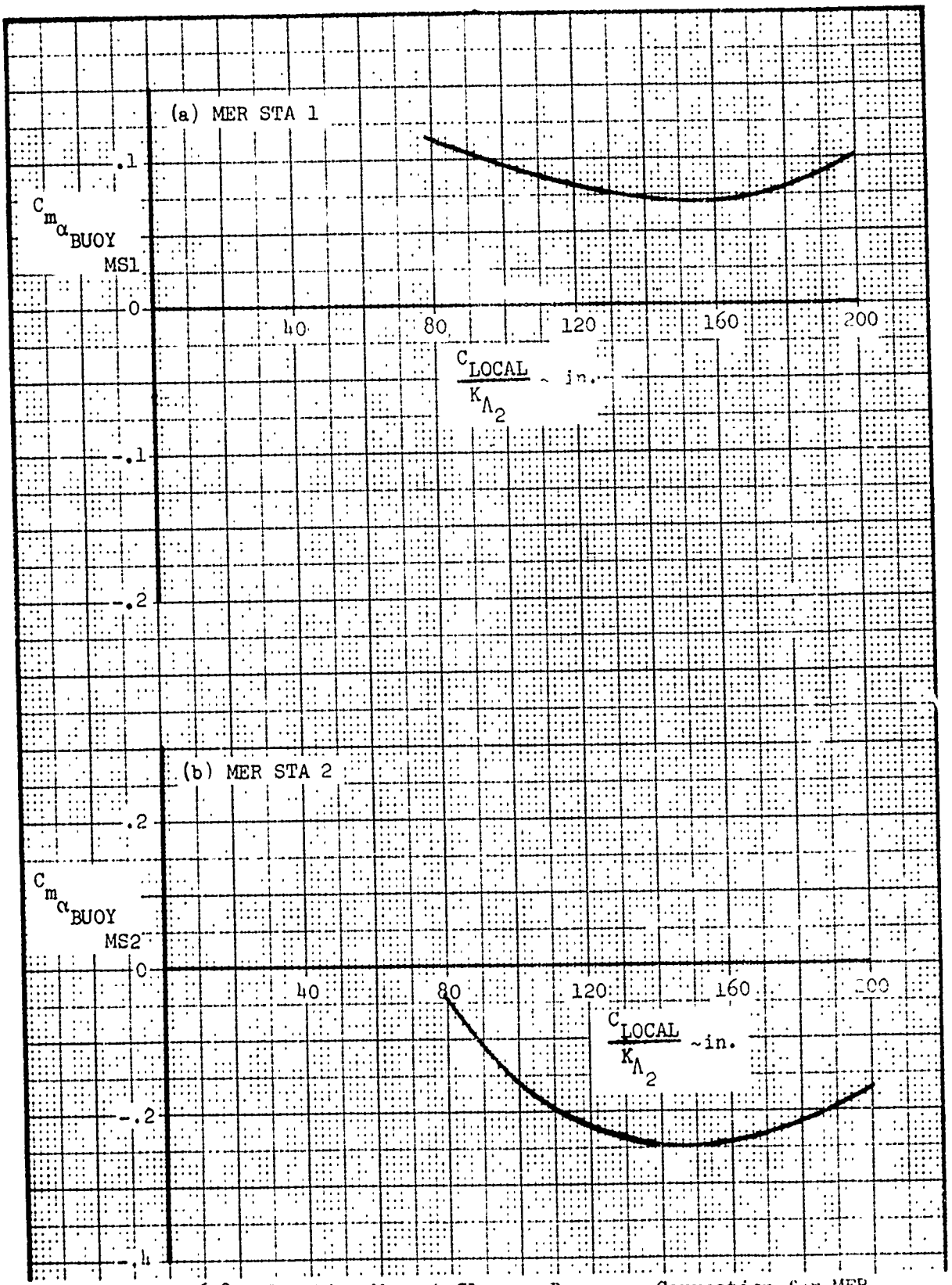


Figure 658. Pitching Moment Slope - Buoyancy Correction for MER Stations 1 and 2

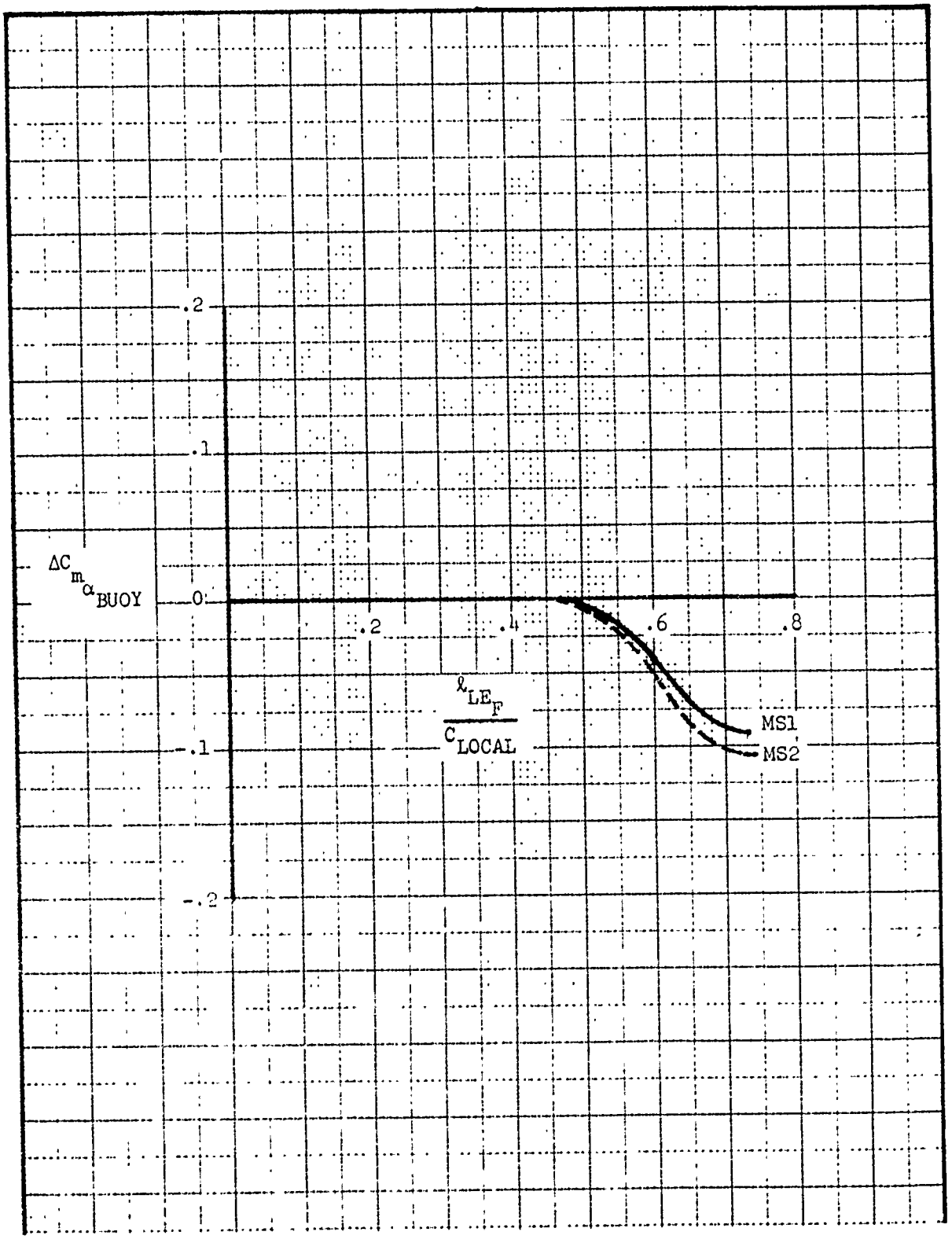


Figure 659. Pitching Moment Slope - Buoyancy Chordwise Position Correction for MER Stations 1 and 2

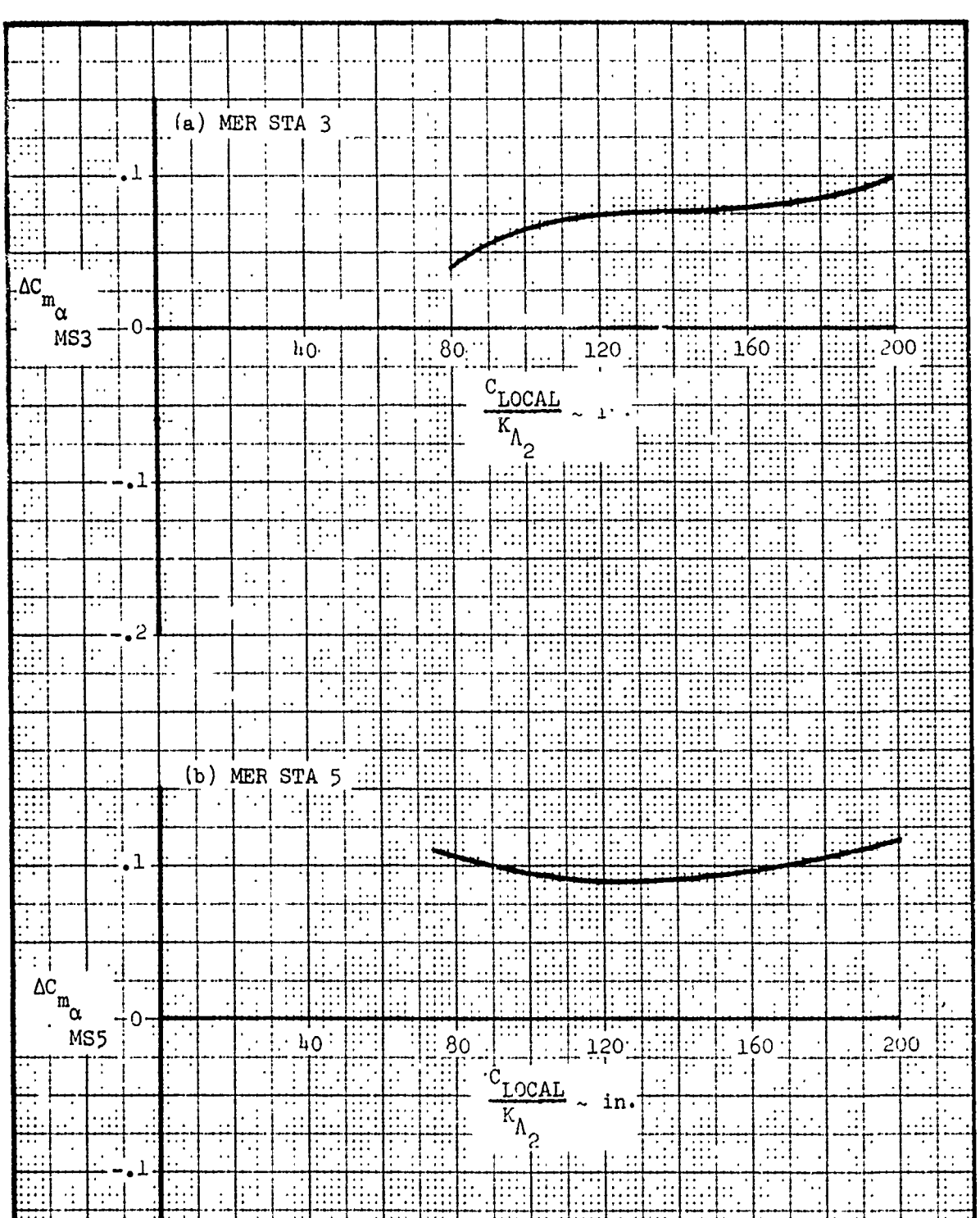


Figure 660. Pitching Moment Slope - Incremental Coefficient for MER Stations 3 and 5

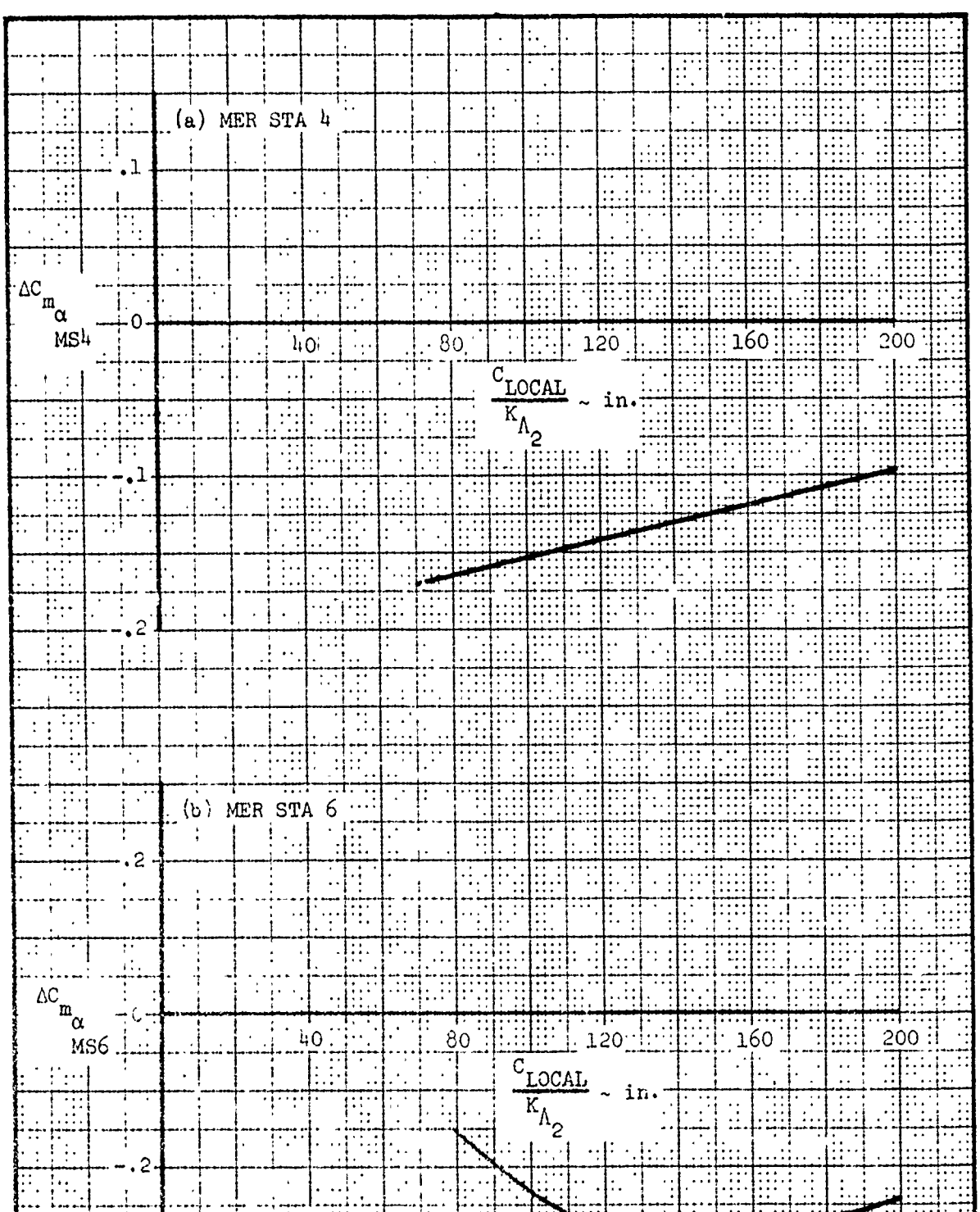


Figure 061. Pitching Moment Slope - Incremental Coefficient for MER Stations 4 and 6

4.4.1.2 Slope Mach Number Correction

To compute the variation in pitching moment slope with angle of attack, $\left(\frac{PM}{q}\right)_\alpha$, between M=0.5 and M=1.6, use the following equation.

$$\left(\frac{PM}{q}\right)_{\substack{\alpha \\ M=x}} = \left(\frac{PM}{q}\right)_{\substack{\alpha \\ PRED}} + \Delta\left(\frac{PM}{q}\right)_{\substack{\alpha \\ M=x}}$$

where:

$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha \\ M=x}}$ - Increment in pitching moment slope at M=x, $\frac{ft^3}{deg}$

$\left(\frac{PM}{q}\right)_{\substack{\alpha \\ PRED}}$ - Predicted pitching moment slope at M=0.5, Subsection 4.4.1.1, $\frac{ft^3}{deg}$

FUSELAGE CENTERLINE-MOUNTED STORES

MER Stations 1, 2, 3, 4, 5 and 6 (MS1-6):

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha \\ M=x \\ MS1-6}} = K_{SCALE_{PM}} \Delta C_{m_{\alpha_{\substack{\ell \\ MS1-6}}}} = f(M)$$

where:

$\Delta C_{m_{\alpha_{\ell}}}$ - Incremental pitching moment slope coefficient as a function of Mach number, $\frac{1}{deg}$.

MER STA 1 - Figure 662
MER STA 2 - Figure 662
MER STA 3 - Figure 662
MER STA 4 - Figure 662
MER STA 5 - Figure 662
MER STA 6 - Figure 662

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

WING-MOUNTED STORES

The generalized curve of the variation of $\left(\frac{PM}{q}\right)_\alpha$ with Mach number is given by Figure 216 in Subsection 3.4.1.2. The slope variation with Mach number is approximated by a series of linear segments. Each Mach number where the line segments change slope is designated a break point. The first break point is defined as the Mach number, M_o,

where the value of $\left(\frac{PM}{q}\right)_\alpha$ deviates from the subsonic M=0.5 value. The variation of the Mach break points is presented in Figures 663, 664, and 665 for MER Stations 1-6 as a function of $\frac{C_{LOCAL}}{K_{\Lambda 2}}$. The incremental slope changes at each of the Mach break points for each MER station are presented as a function of various parameters in Figures 666 through 674. This increment is defined as the difference in pitching moment slope at a Mach break point and the M=0.5 value of $\left(\frac{PM}{q}\right)_\alpha$. Information below defines the specific figure numbers where the incremental slope change data are presented.

BREAK 1 (M_1):

$\Delta C_{m_{\alpha_1}}$ MS1-6 is presented in the figures designated below.

MER STA 1 - Figure 666
MER STA 2 - Figure 666
MER STA 3 - Figure 667
MER STA 4 - Figure 668
MER STA 5 - Figure 667
MER STA 6 - Figure 668

BREAK 2 (M_2):

$\Delta C_{m_{\alpha_2}}$ MS1-6 is presented in the figures designated below.

MER STA 1 - Figure 669
MER STA 2 - Figure 669
MER STA 3 - Figure 670
MER STA 4 - Figure 671
MER STA 5 - Figure 670
MER STA 6 - Figure 671

BREAK 3 (M_3):

$C_{n_{\alpha_3}}$ MS1-6 is presented in the figures designated below.

MER STA 1 - Figure 672
MER STA 2 - Figure 672
MER STA 3 - Figure 673
MER STA 4 - Figure 674

MER STA 5 - Figure 673

MER STA 6 - Figure 674

Knowing the incremental slopes at each break point, the calculation of $\left(\frac{PM}{q}\right)_\alpha$ at M=x is possible for each MER station. The computation is based on a linear variation of $\left(\frac{PM}{q}\right)_\alpha$ between the break points where M=x occurs. From Figures 663, 664 and 665 determine between which break point M=x occurs for the subject MER station. Designate these as M_{LOW} and M_{HI} such that $M_{LOW} \leq x < M_{HI}$. If $x \leq M_o$, use the value of $\left(\frac{PM}{q}\right)_\alpha$ predicted in Subsection 4.4.1.1. Using the equation below $\underset{\substack{M=x \\ MS1-6}}{\left(\frac{PM}{q}\right)_\alpha}$ can be computed.

$$\underset{\substack{M=x \\ MS1-6}}{\left(\frac{PM}{q}\right)_\alpha} = \underset{\substack{PRED \\ MS1-6}}{\left(\frac{PM}{q}\right)_\alpha} + \left[\underset{\substack{LOW \\ MS1-6}}{\Delta C_{m_\alpha}} + \left(\frac{x - M_{LOW}}{M_{HI} - M_{LOW}}\right) \left(\underset{\substack{HI \\ MS1-6}}{\Delta C_{m_\alpha}} - \underset{\substack{LOW \\ MS1-6}}{\Delta C_{m_\alpha}} \right) \right] K_{SCALE_{PM}}$$

A similar computational procedure is included in Subsection 4.2.1.2.

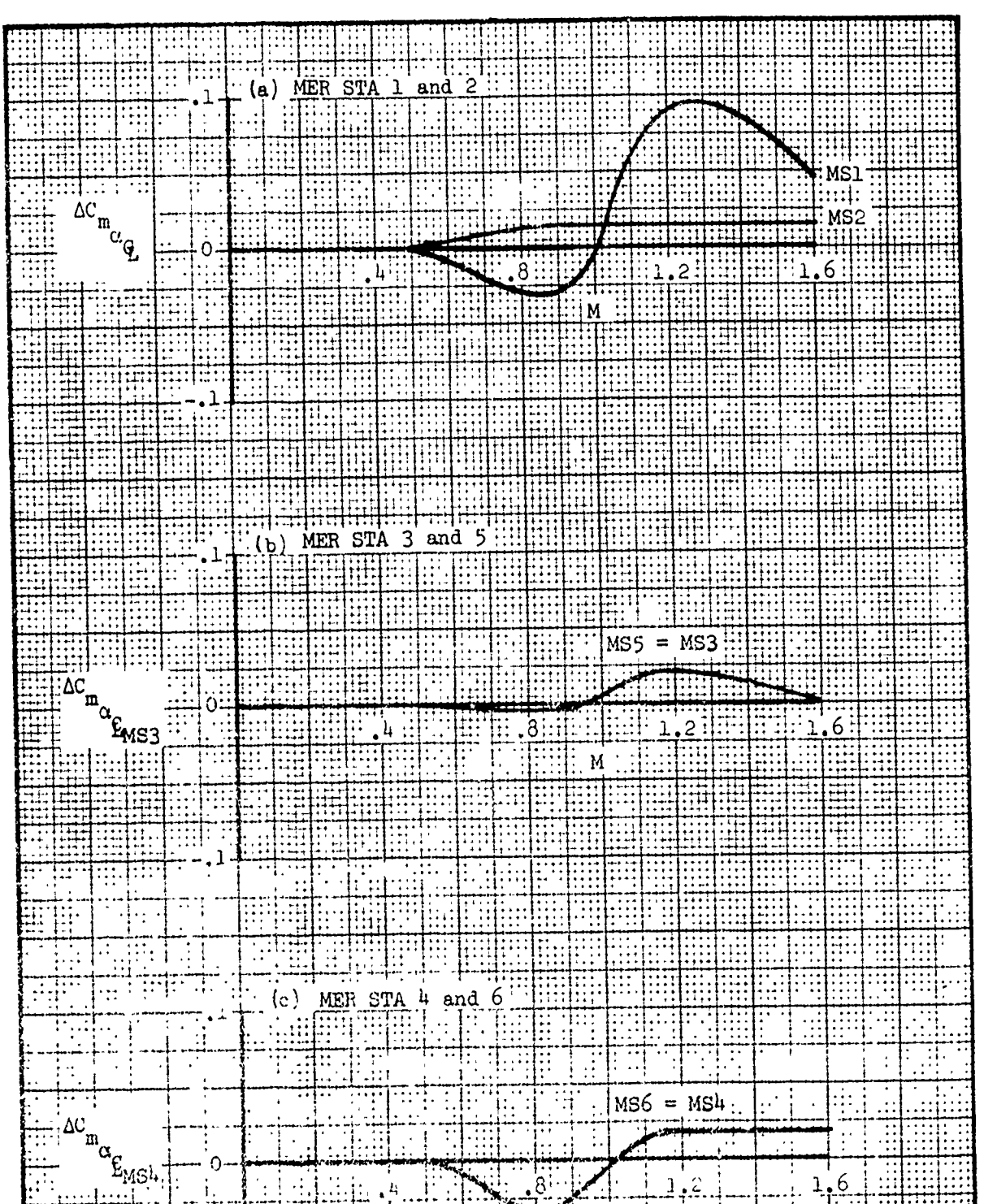


Figure 662. Pitching Moment Slope - Mach Number Correction for Stores Mounted on Fuselage Centerline, MER Stations 1-6

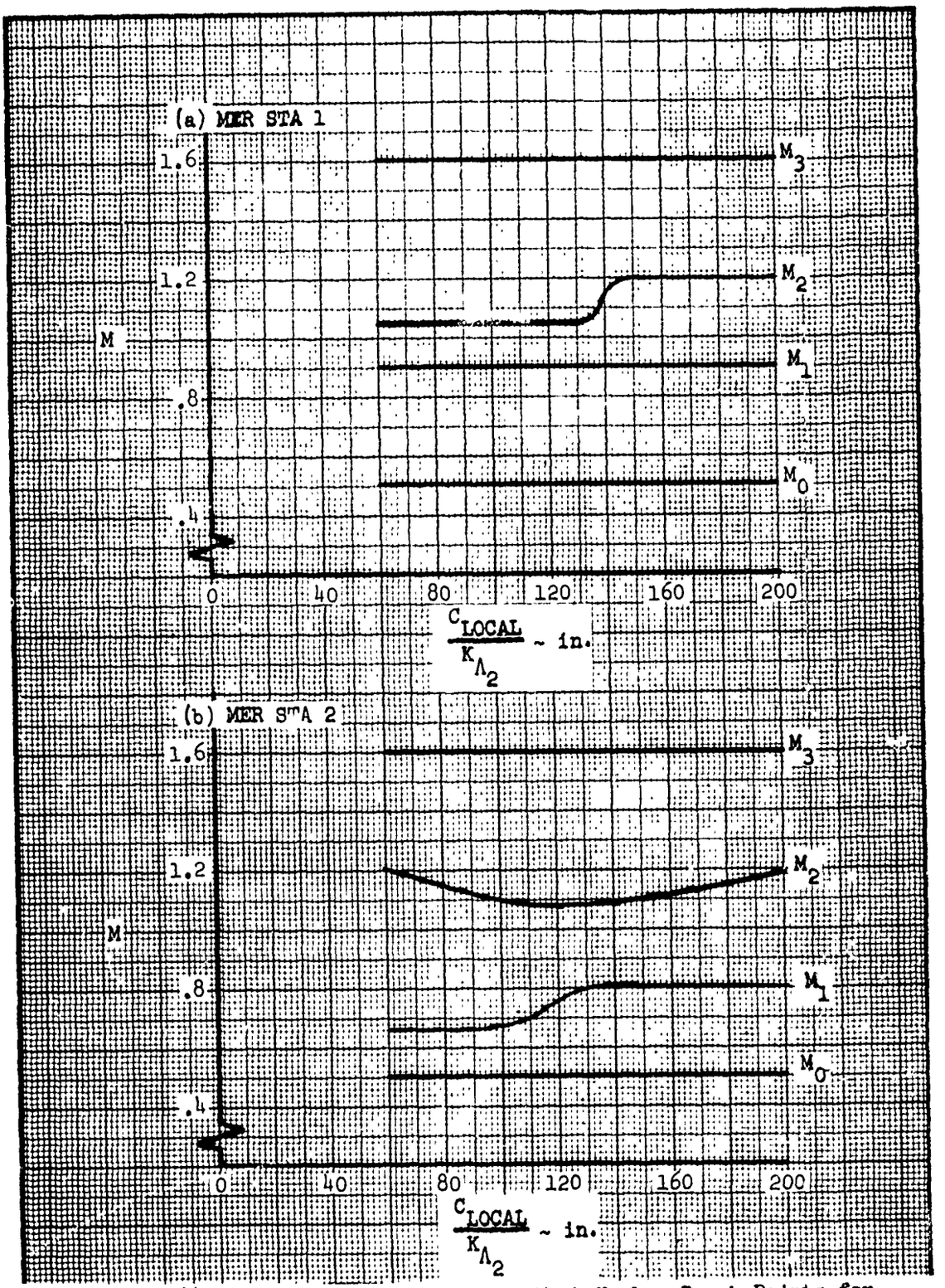


Figure 663. Pitching Moment Slope - Mach Number Break Points for MER Stations 1 and 2

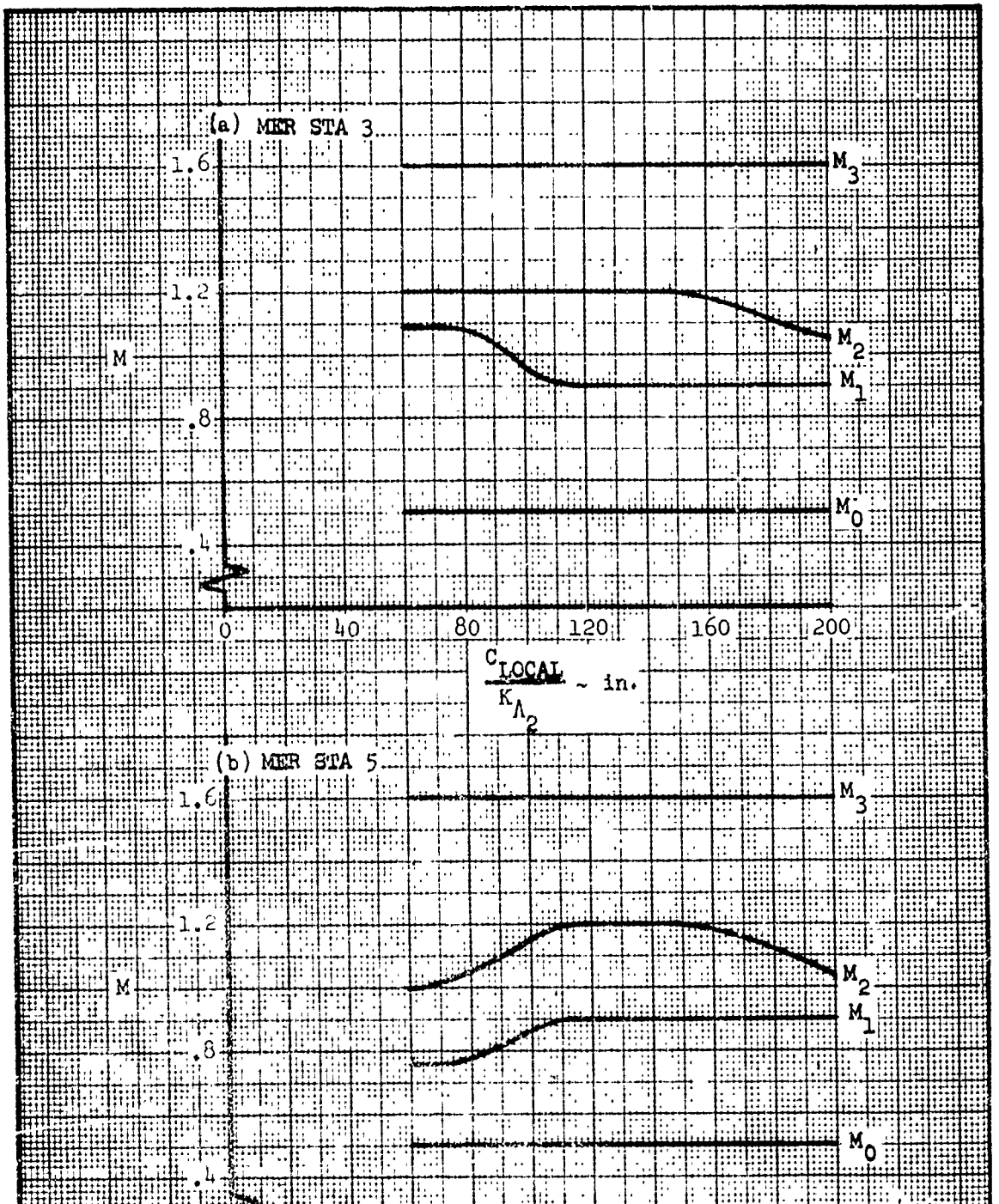


Figure 66h Pitching Moment Slope ~ Mach Number Break Points for MER Stations 3 and 5

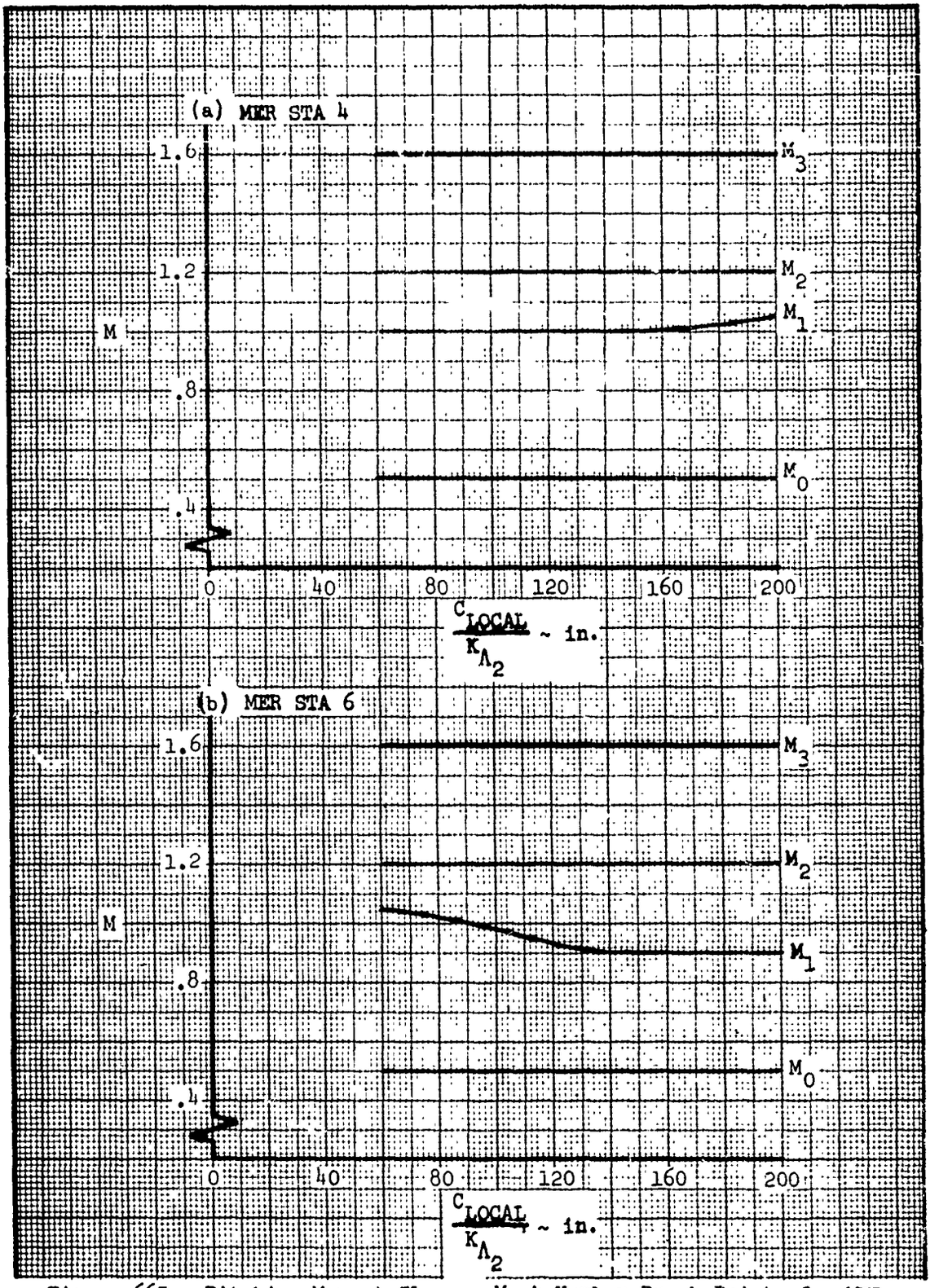


Figure 665. Pitching Moment Slope - Mach Number Break Points for MER Stations 4 and 6

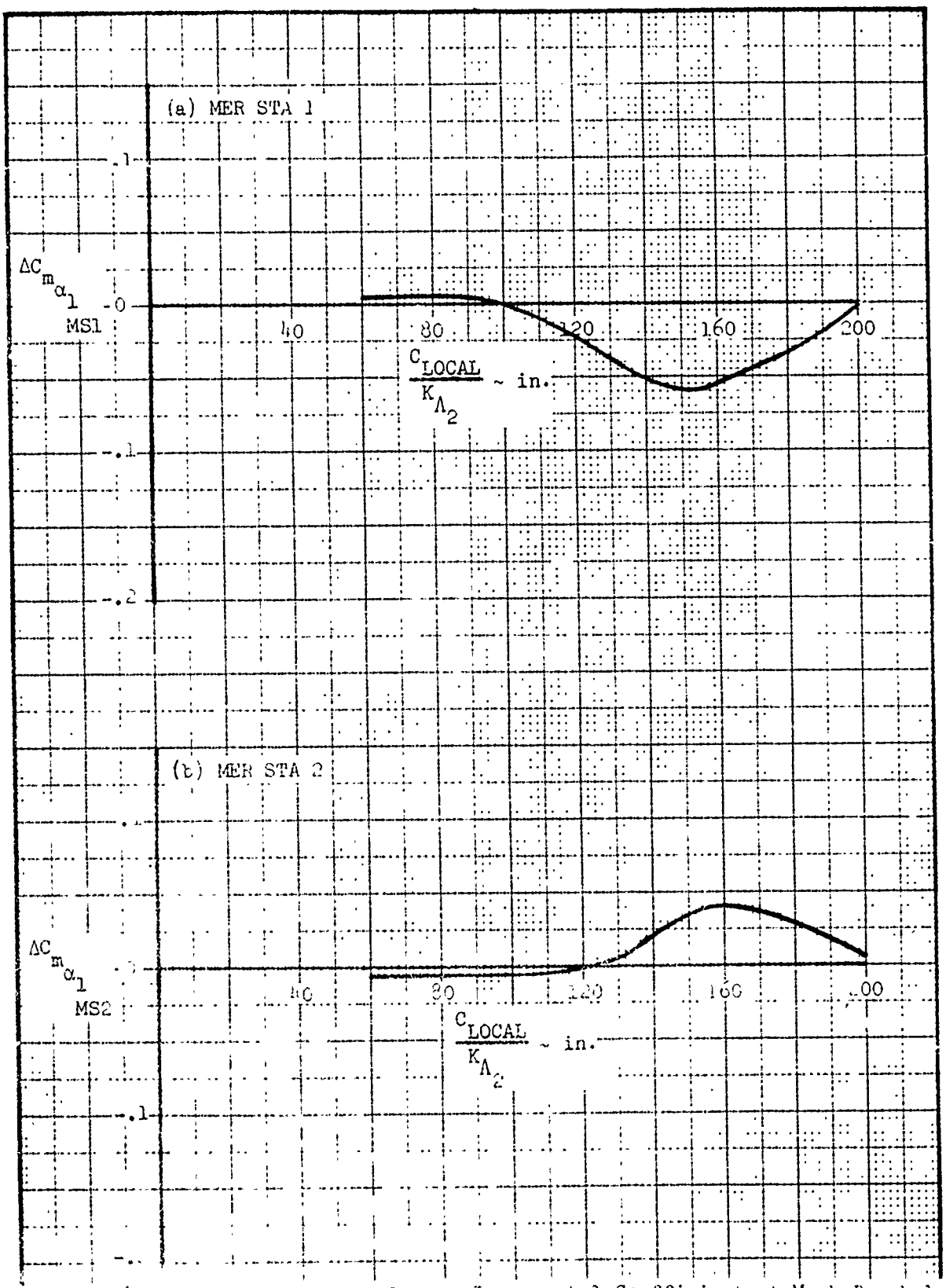


Figure 666. Pitching Moment Slope - Incremental Coefficient at Mach Break 1 - MER Stations 1 and 2

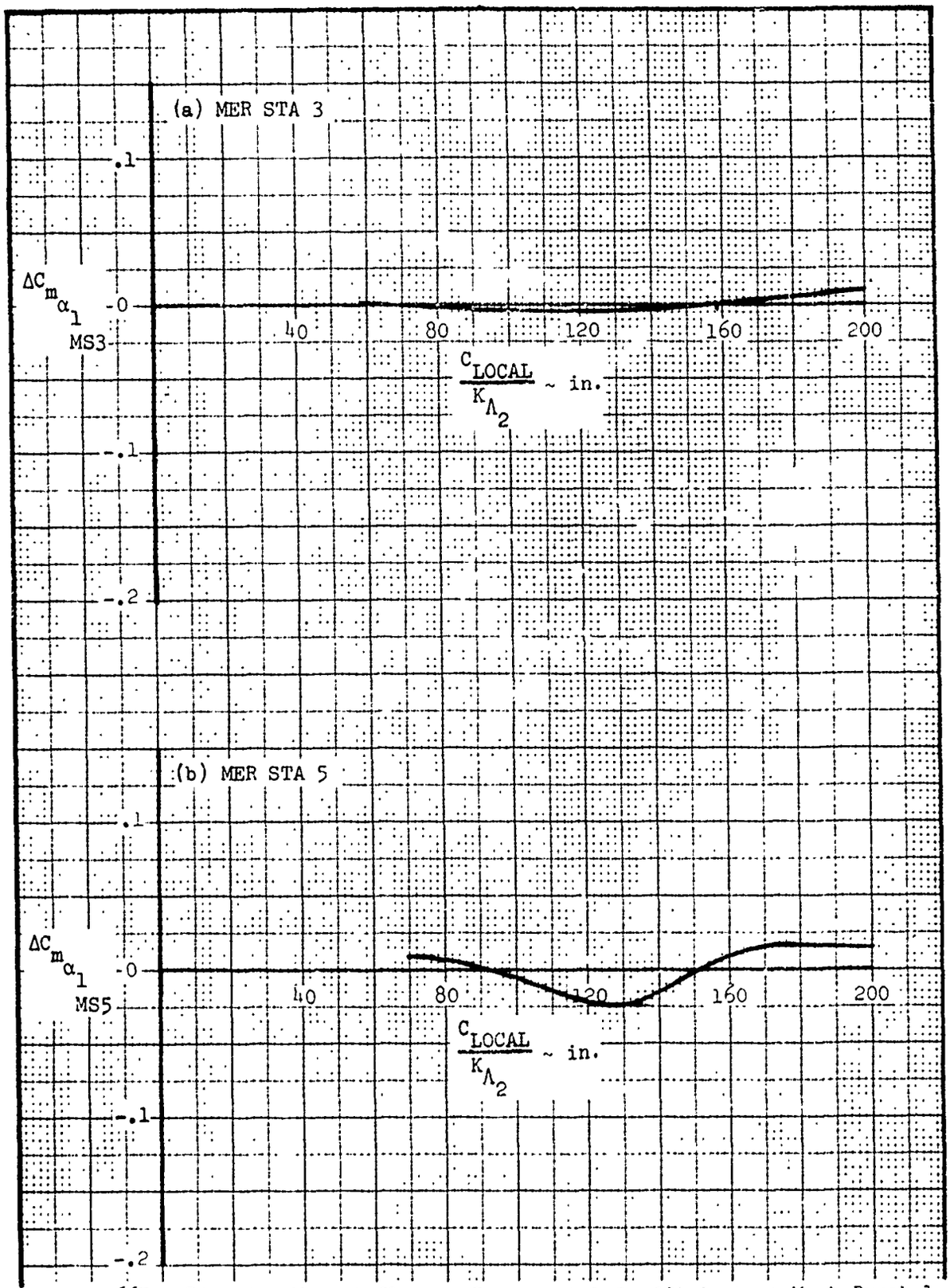


Figure 667. Pitching Moment Slope - Incremental Coefficient at Mach Break 1 for MER Stations 3 and 5

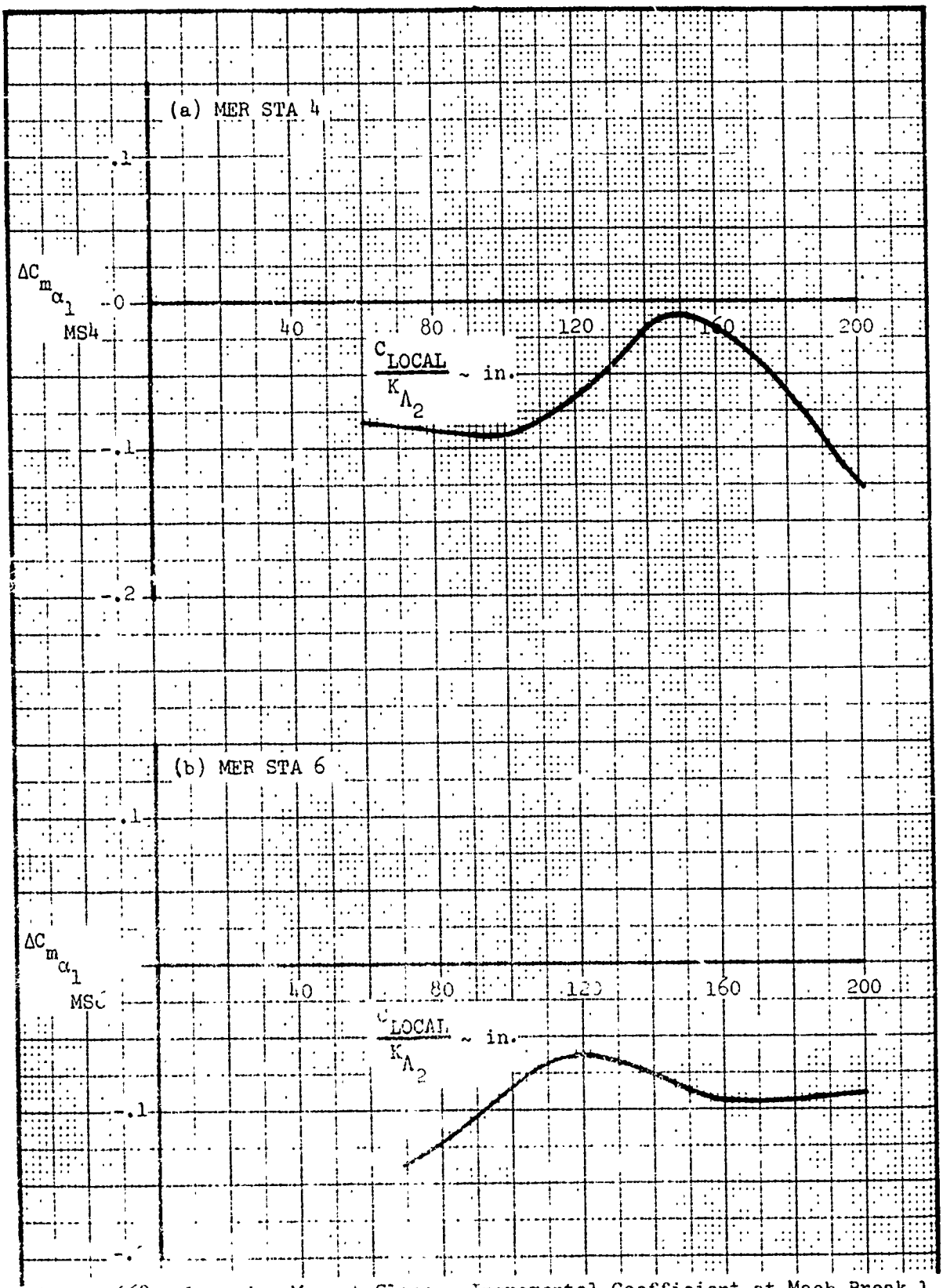


Figure 668. Pitching Moment Slope - Incremental Coefficient at Mach Break 1 for MER Stations 4 and 6

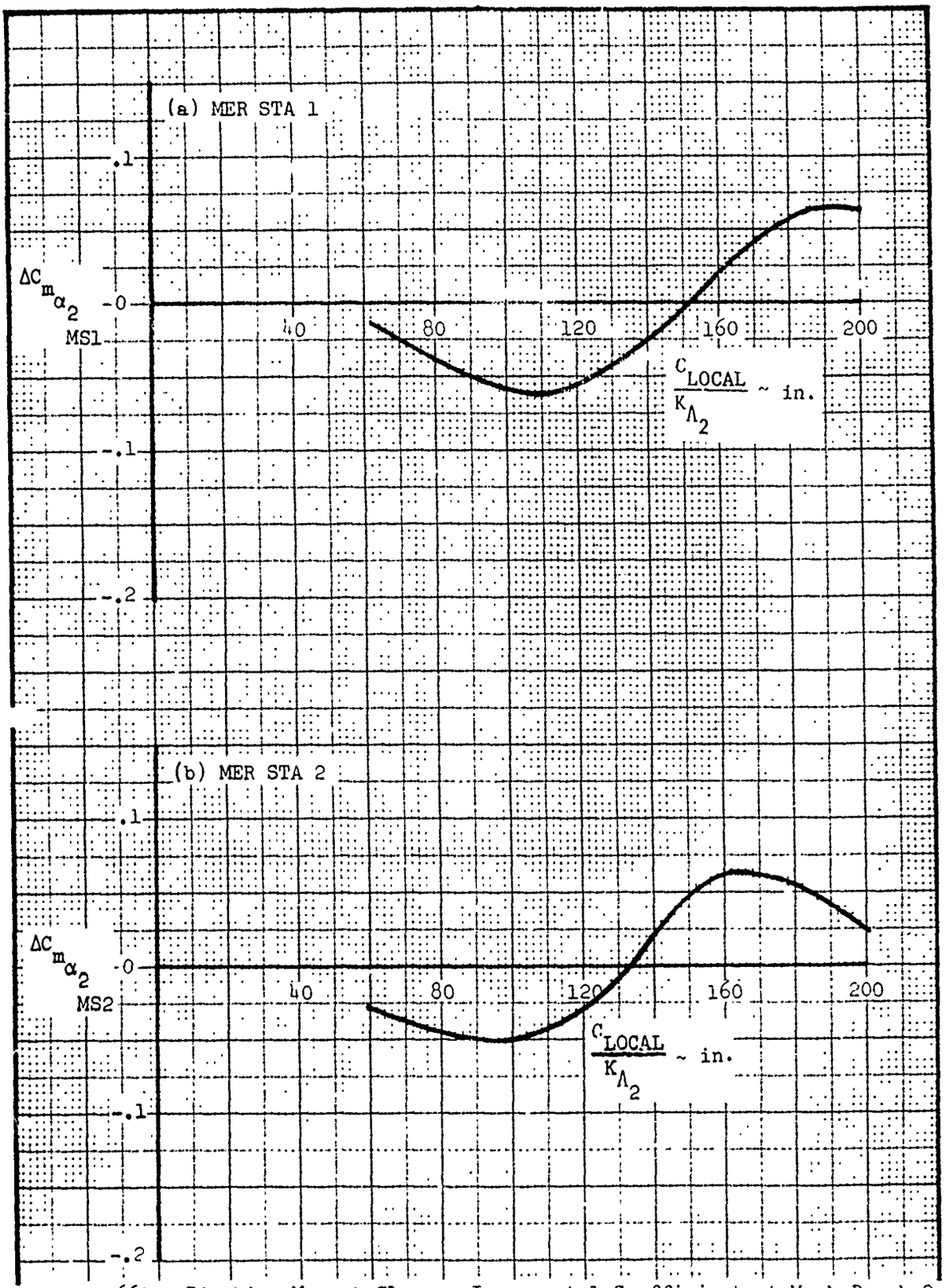


Figure 669. Pitching Moment Slope - Incremental Coefficient at Mach Break 2 for MER Stations 1 and 2

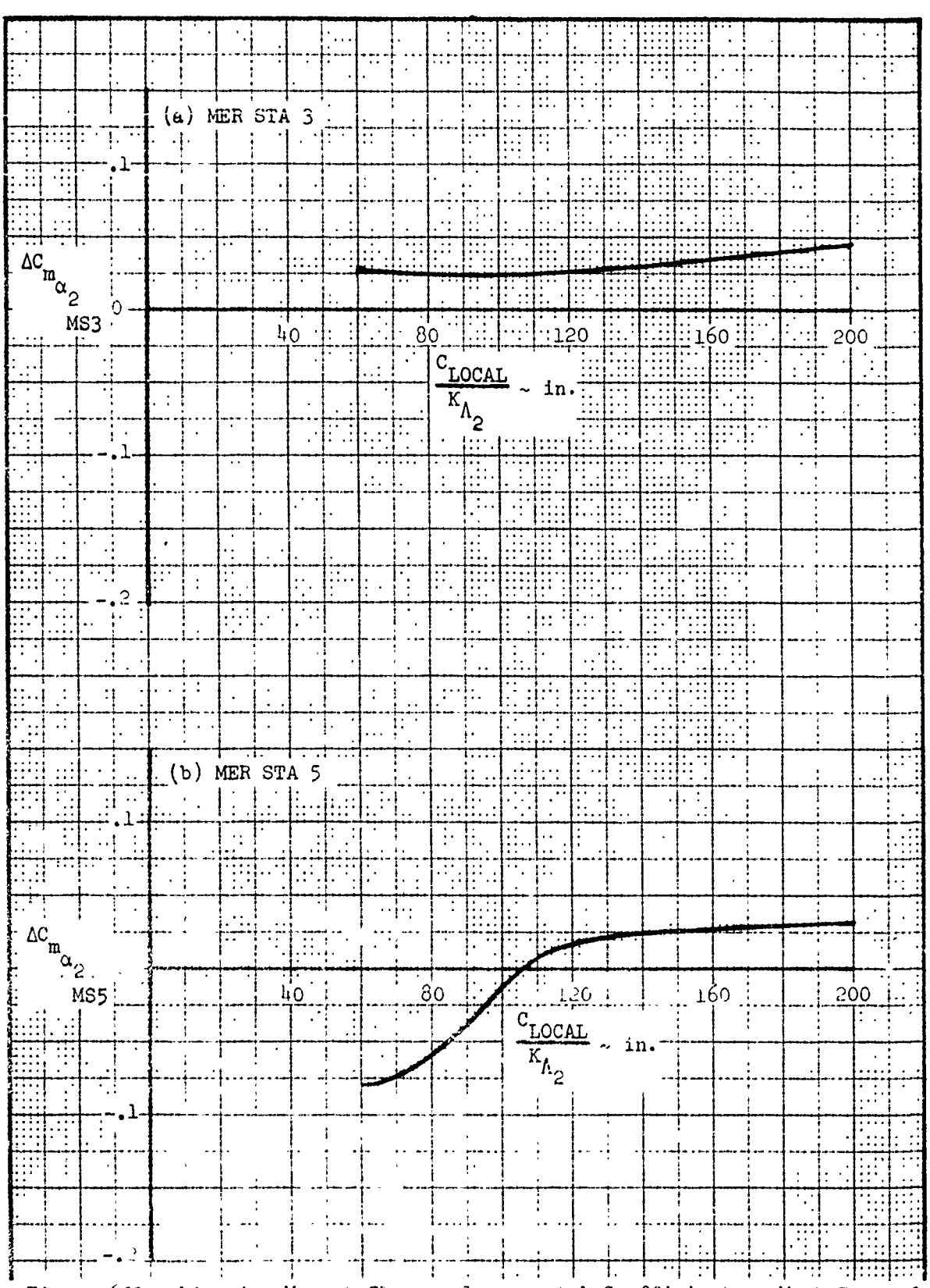


Figure 670. Pitching Moment Slope - Incremental Coefficient at Mach Break 2 for MER Stations 3 and 5

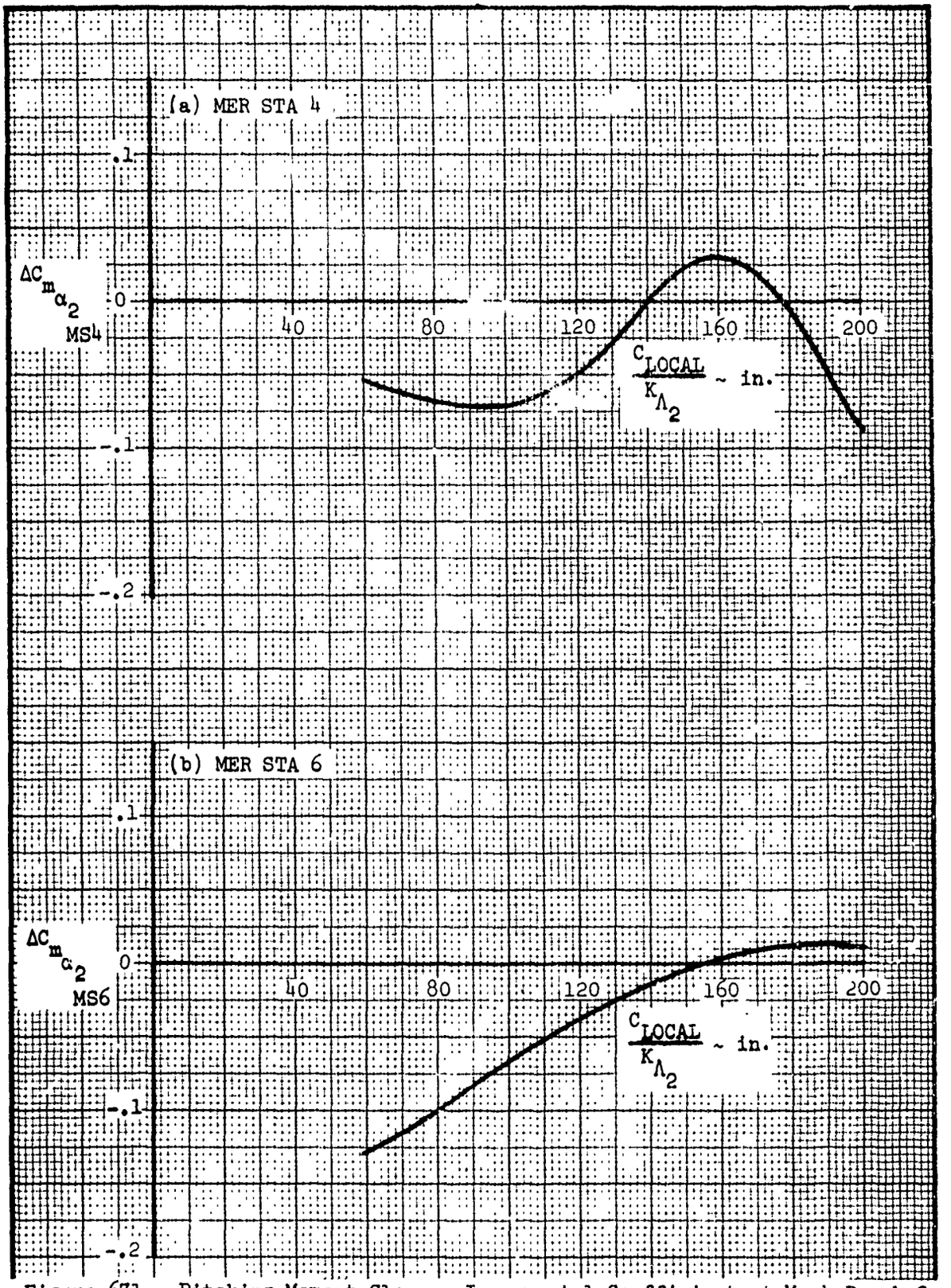


Figure 671. Pitching Moment Slope - Incremental Coefficient at Mach Break 2 for MER Stations 4 and 6

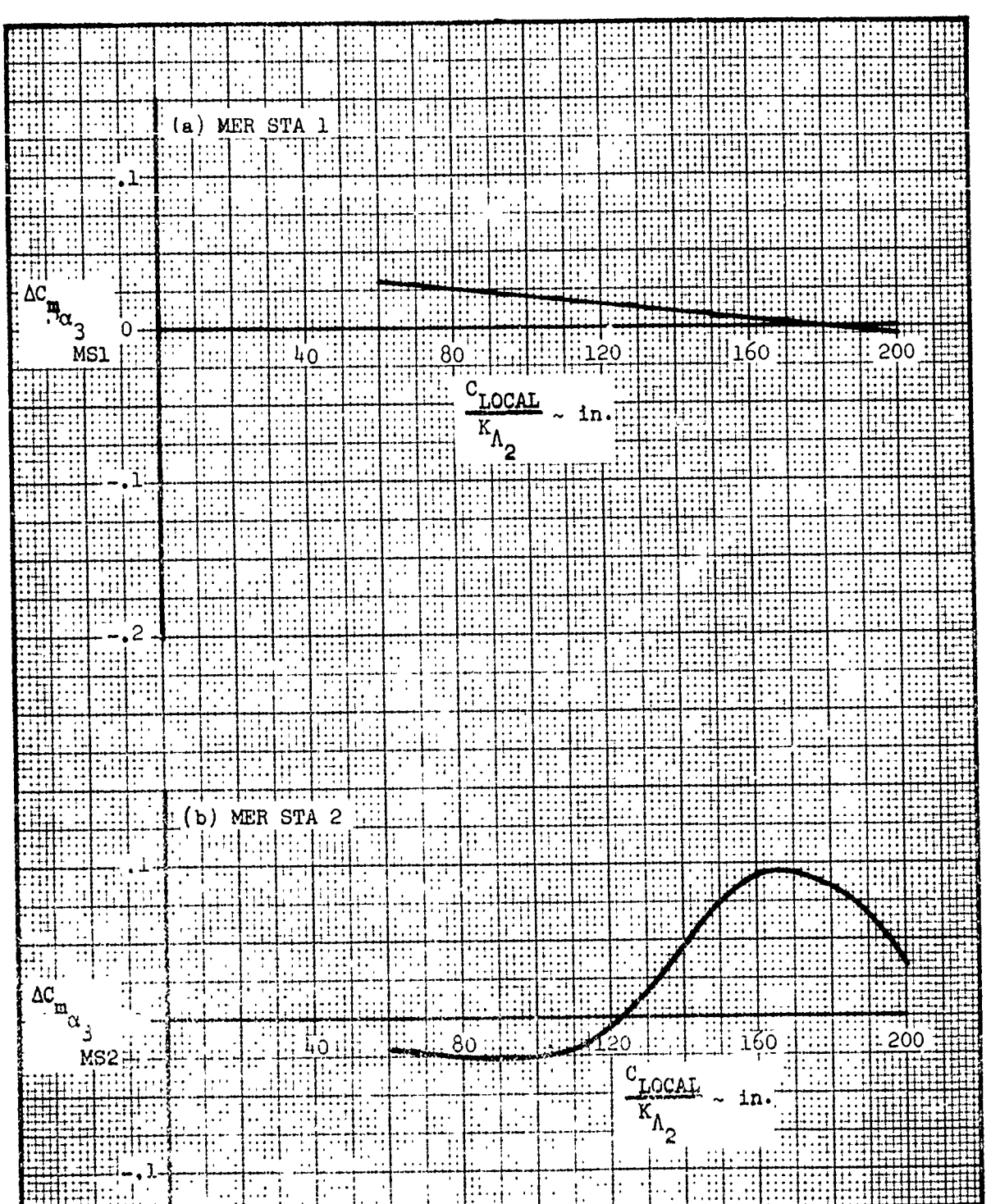


Figure 672. Pitching Moment Slope - Incremental Coefficient at Mach Break 3 for MER Stations 1 and 2

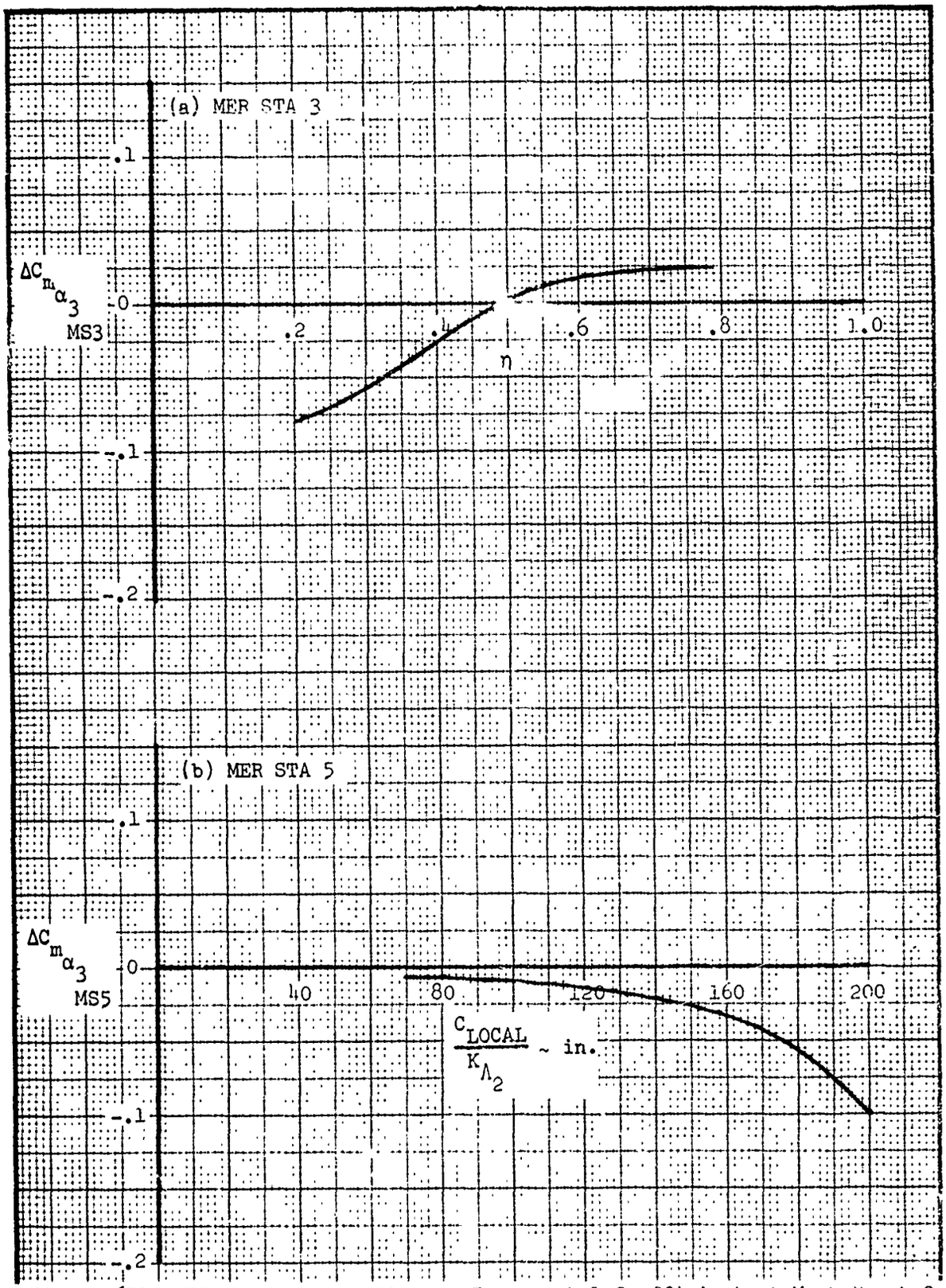


Figure 673. Pitching Moment Slope - Incremental Coefficient at Mach Break 3 for MER Stations 3 and 5

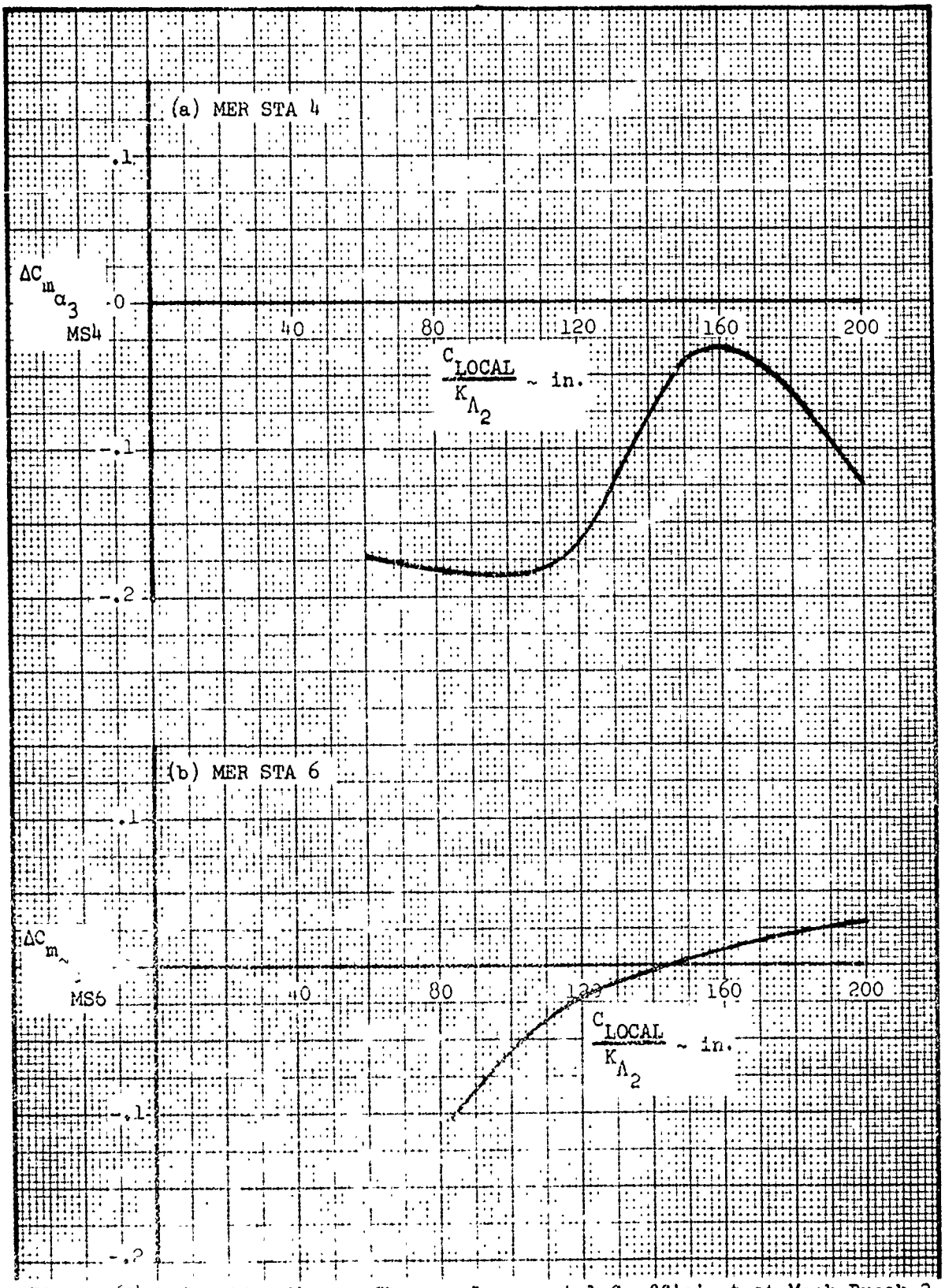


Figure 674. Pitching Moment Slope - Incremental Coefficient at Mach Break 3 for MER Stations 4 and 6

4.4.1.3 Intercept Prediction

The value of captive store pitching moment at $\alpha=0$ for M=0.5 is computed using the following relationships.

FUSELAGE CENTERLINE-MOUNTED STORES

MER Stations 1, 2, 3, 4, 5 and 6 (MS1-6):

$$\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ PRED \\ MS1-6}} = \left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ \ell \\ MS1-6}} = f(d)$$

where:

$\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ \ell}}$ - Fuselage centerline captive store pitching moment at $\alpha=0$, ft^3, presented as a function of store diameter.

MER STA 1 - Figure 675
MER STA 2 - Figure 675
MER STA 3 - Figure 676
MER STA 4 - Figure 676
MER STA 5 - Figure 676
MER STA 6 - Figure 676

WING-MOUNTED STORES

MER Stations 1, 2, 3, 4, 5, and 6 (MS1-6):

$$\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ PRED \\ MS1-6}} = K_{\Lambda_2}\left[\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ \ell \\ MS1-6}} + K_{SCALE_{PM}}\left(\Delta C_{m_{\substack{\alpha=0 \\ MS1-6}}} + \Delta C_{m_{\substack{\alpha=0 \\ INTF \\ MS1-6}}}\right)\right]$$

where:

K_{Λ_2} - Aircraft wing sweep correction factor based on the sweep angle, Λ, of the quarter-chord, $\frac{\cos \Lambda}{\cos 45^\circ}$.

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

$\Delta C_{m_{\alpha=0}}$ - Incremental pitching moment coefficient at $\alpha=0$ for wing-mounted stores, $\frac{1}{deg}$.

MER STA 1 - Figure 677

MER STA 2 - Figure 677

MER STA 3 - Figure 679

MER STA 4 - Figure 678

MER STA 5 - Figure 679

MER STA 6 - Figure 678

$\Delta C_{m_{\substack{\alpha=0 \\ INTF}}}$ - Incremental pitching moment coefficient at $\alpha=0$ due to fuselage interference for wing-mounted stores as a function of η'.

MER STA 1 - Figure 680

MER STA 2 - Figure 680

MER STA 3 - Figure 680

MER STA 4 - Figure 680

MER STA 5 - Figure 680

MER STA 6 - Figure 680

A numerical example of a similar computational procedure is included in Subsection 4.2.1.3.

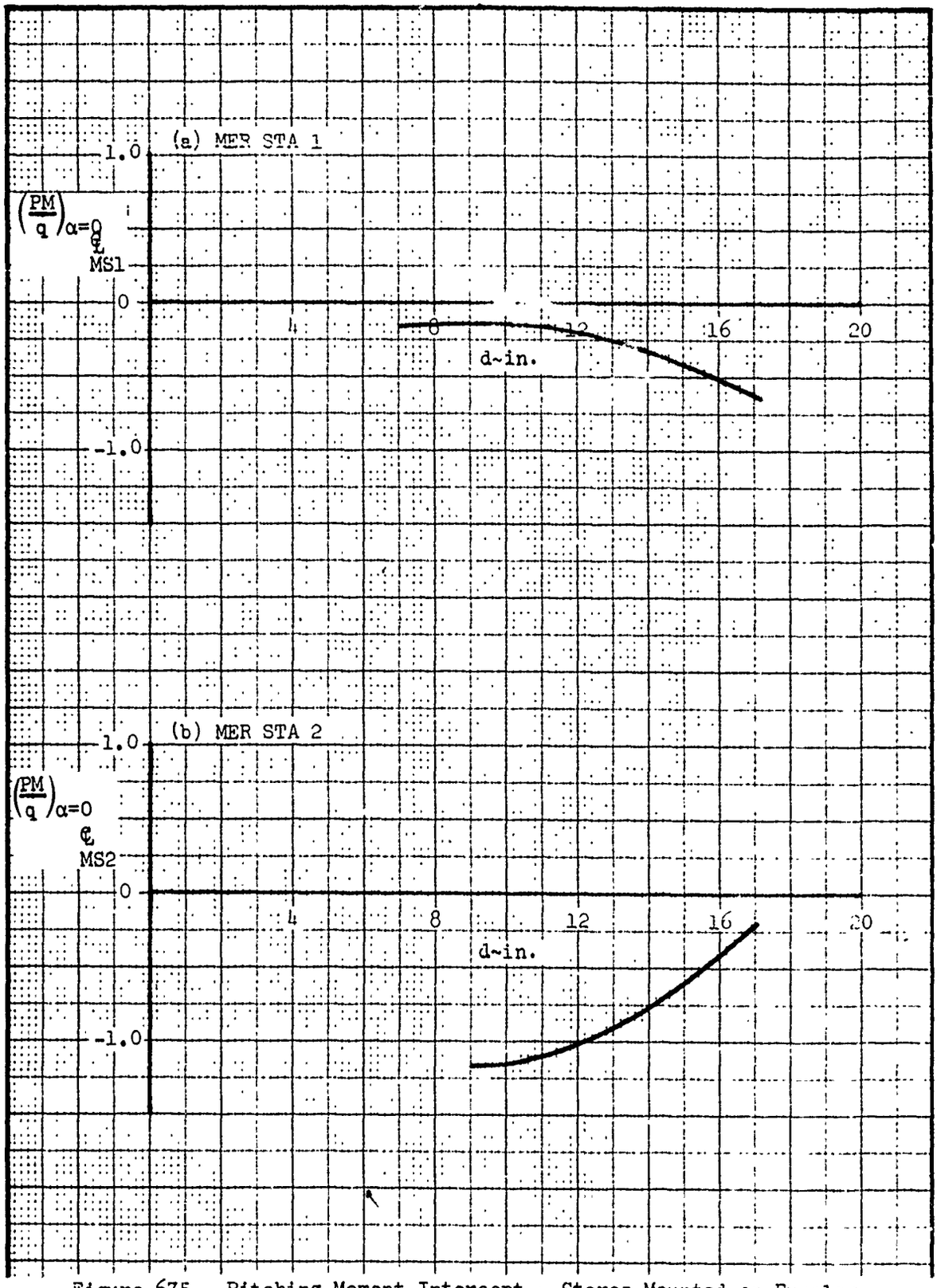


Figure 675. Pitching Moment Intercept - Stores Mounted on Fuselage Centerline, MER Stations 1 and 2

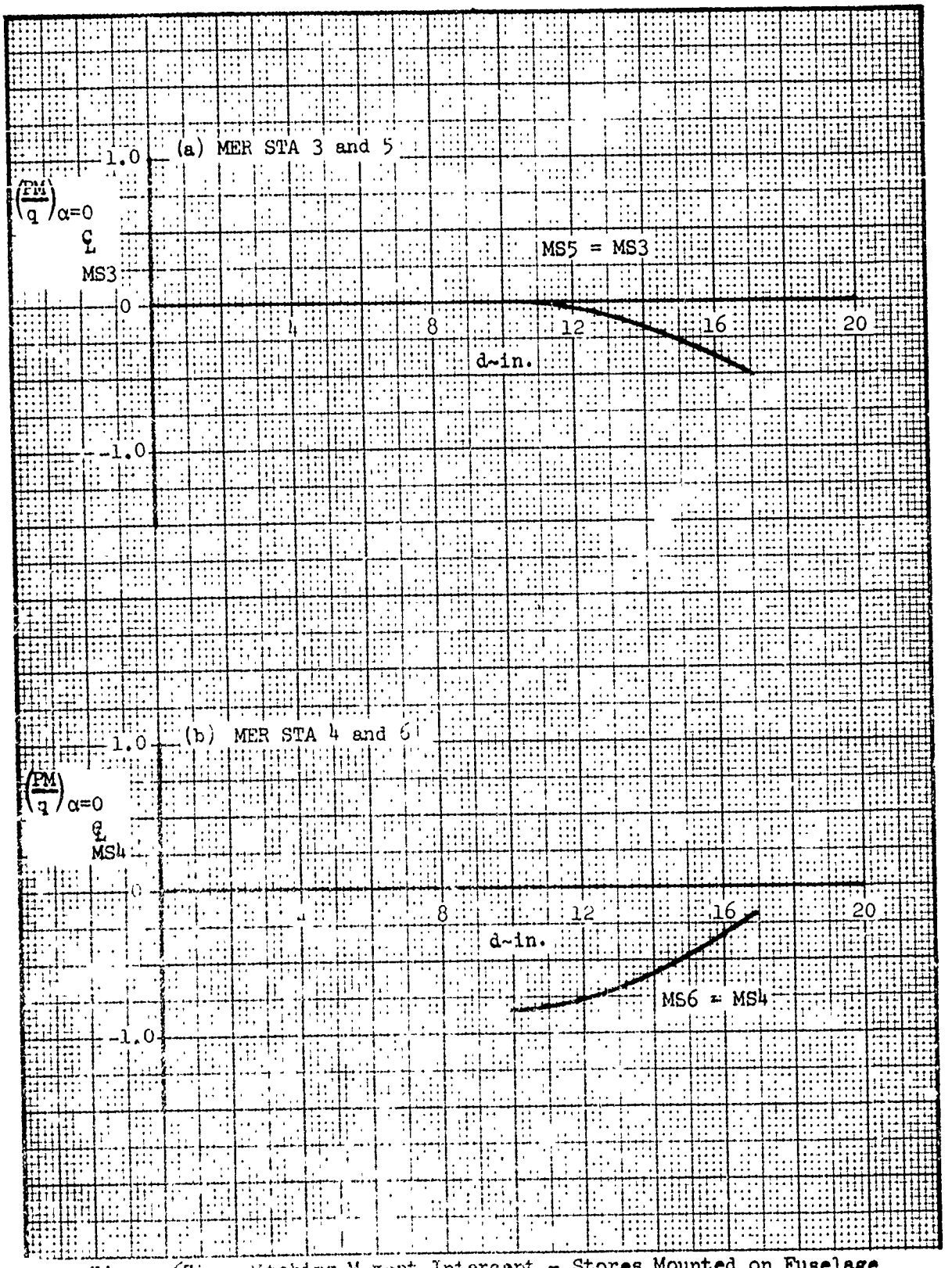


Figure 67. Pitching Moment Intercept - Stores Mounted on Fuselage Centerline, MER Stations 3-6

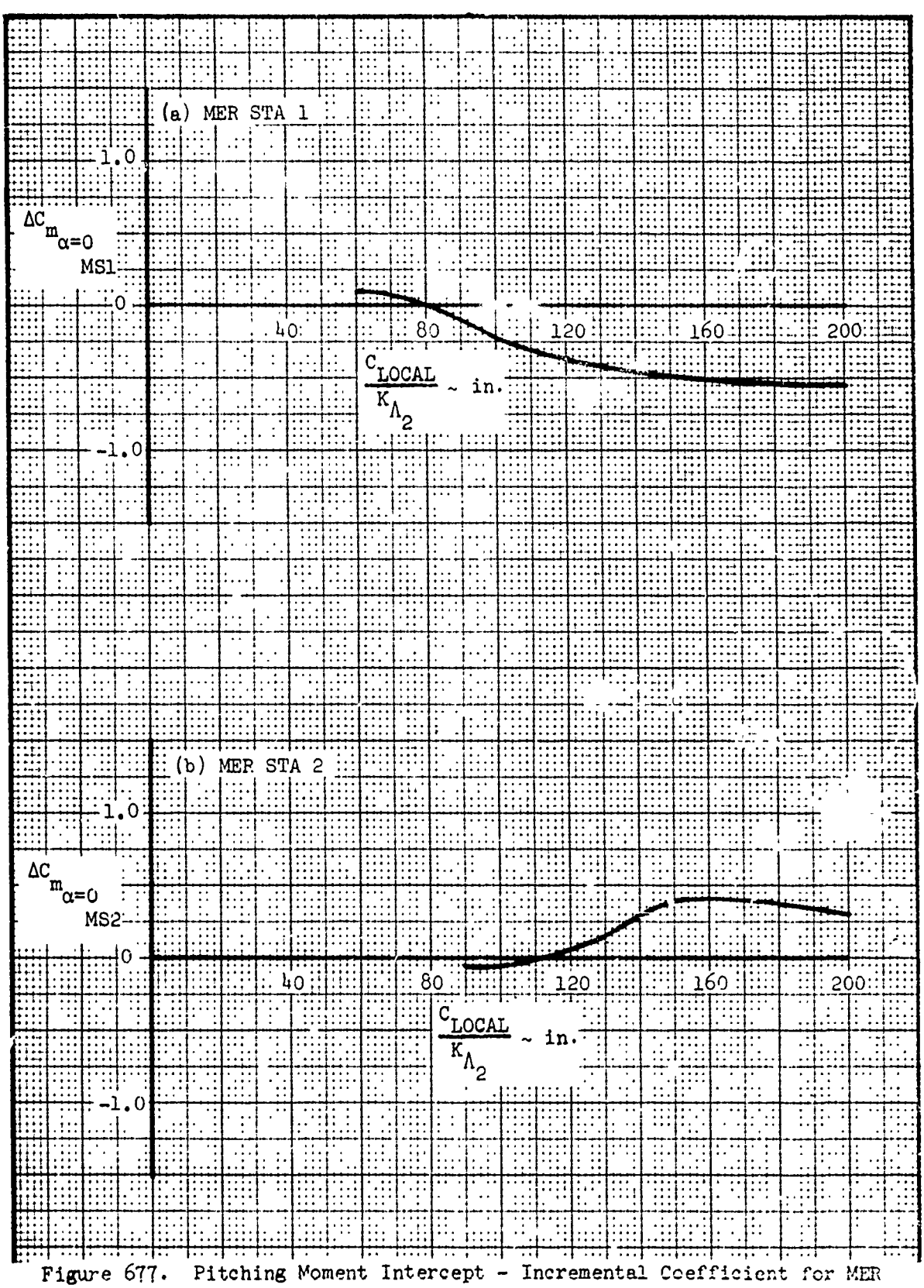


Figure 677. Pitching Moment Intercept - Incremental Coefficient for MER Stations 1 and 2

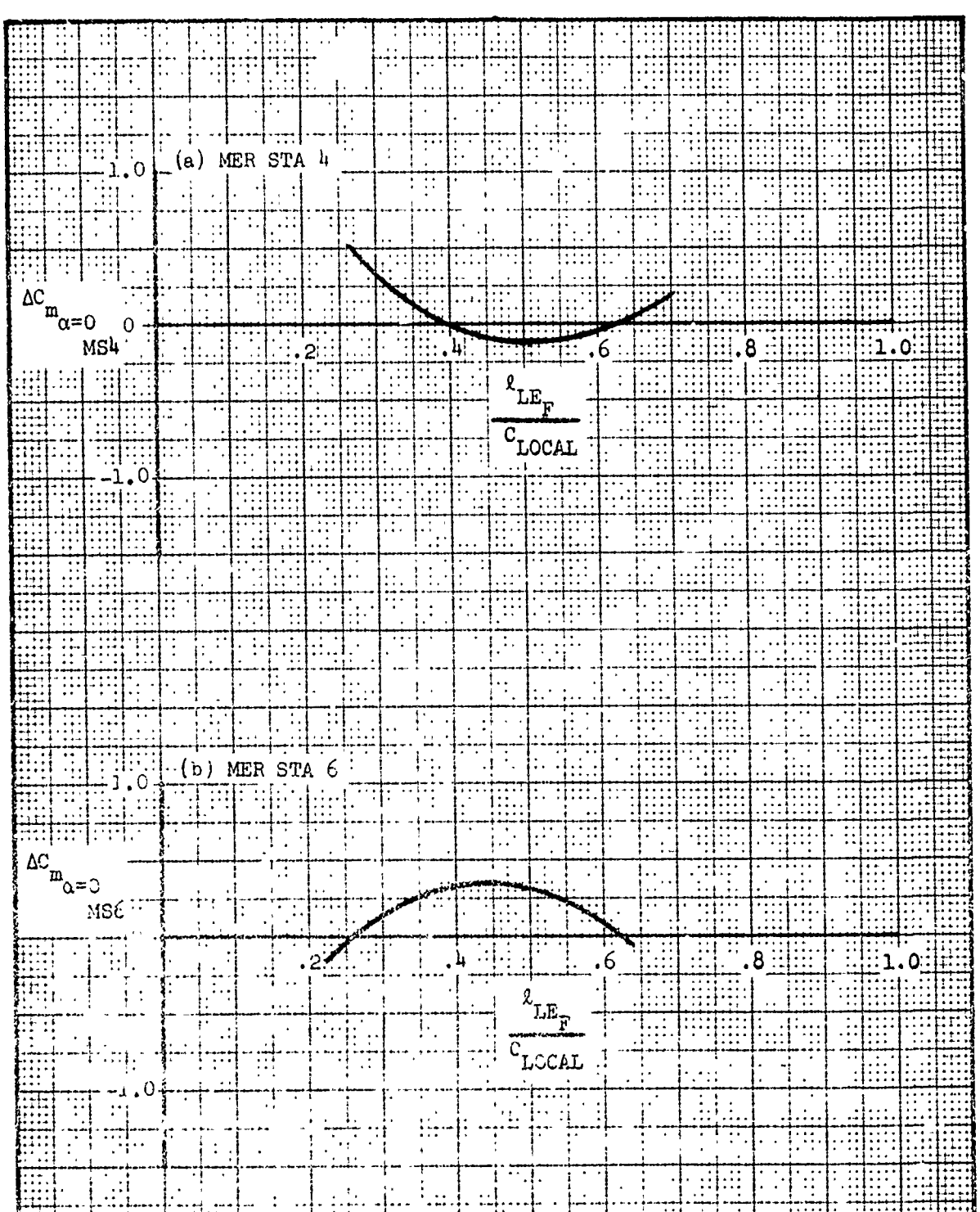


Figure 578. Pitching Moment Intercept - Incremental Coefficient for MER Stations 4 and 6

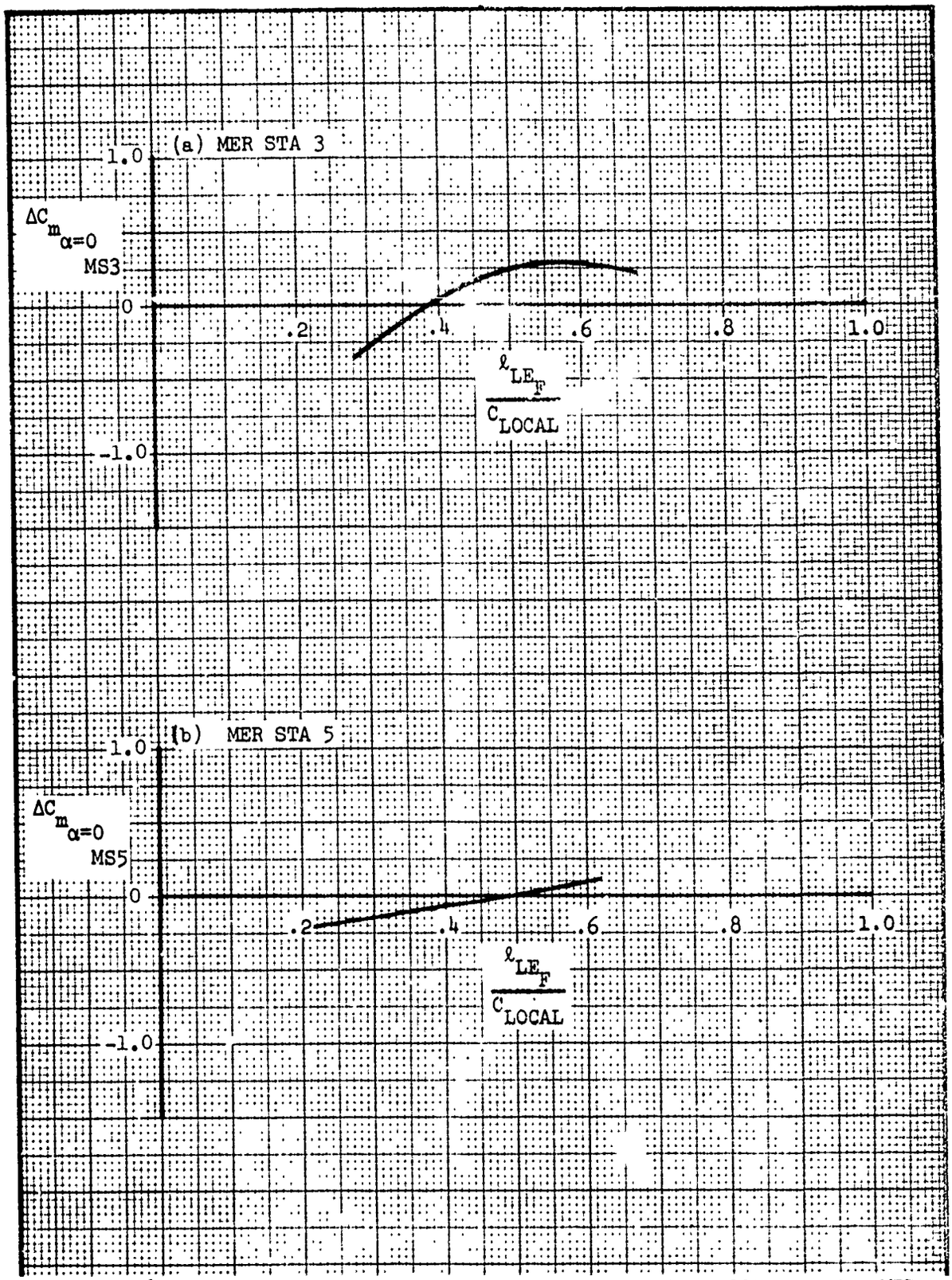


Figure 679. Pitching Moment Intercept - Incremental Coefficient for MFR Stations 3 and 5

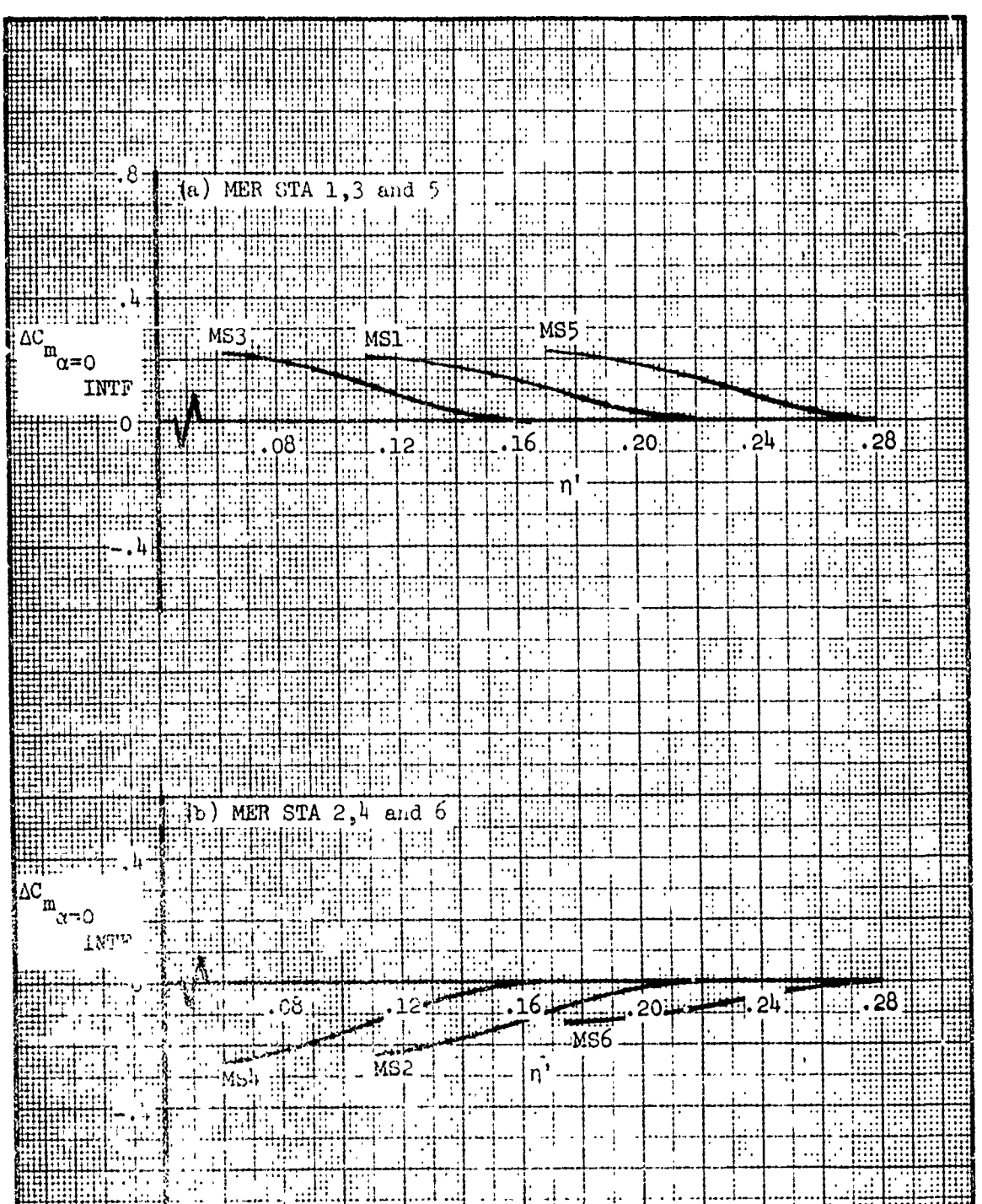


Figure 6-0. Pitching Moment Intercept - Fuselage Interference Correction for MER Stations 1-6

4.4.1.4 Intercept Mach Number Correction.

To compute the variation in pitching moment intercept, $\left(\frac{PM}{q}\right)$ at $\alpha=0$, between M=0.5 and M=1.6, use the following equation.

$$\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ M=x}} = \left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ PRED}} + \Delta\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ M=x}}$$

where:

$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ M=x}}$ - Increment in pitching moment intercept at M=x, ft^3.

$\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ PRED}}$ - Predicted pitching moment intercept at M=0.5, Section 4.4.1.3, ft^3.

FUSELAGE CENTERLINE-MOUNTED STORES

MER Stations 1,2,3,4,5, and 6 (MS1-6):

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ M=x \\ MS1-6}} = K_{SCALE_{PM}} \cdot \Delta C_{m_{\substack{\alpha=0 \\ \ell \\ MS1-6}}} = f(M)$$

where:

$\Delta C_{m_{\substack{\alpha=0 \\ \ell}}}$ - Incremental pitching moment intercept coefficient as a function of Mach number.

MER STA 1 - Figure 681
MER STA 2 - Figure 681
MER STA 3 - Figure 681
MER STA 4 - Figure 681
MER STA 5 - Figure 681
MER STA 6 - Figure 681

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

WING-MOUNTED STORES

Reference is made to the discussion in Subsection 4.4.1.2 under WING-MOUNTED STORES for an explanation of the Mach correction concept which will be used here. The variation in Mach break points is presented in Figures 682, 683, and 684 for each MER station. Information below defines the figure numbers where the incremental intercept data are presented.

BREAK 1 (M_1):

MER Stations 1, 2, 3, 5, and 6 (MS1-3,5,6):

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha=0_1 \\ MS1-3,5,6}} = K_{SCALE_{PM}} \Delta C_{m_{\substack{\alpha=0_1 \\ MS1-3,5,6}}}$$

where:

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

$\Delta C_{m_{\alpha=0_1}}$ - Incremental pitching moment intercept coefficient at $M=M_1$.

MER STA 1 - Figure 685
MER STA 2 - Figure 685
MER STA 3 - Figure 686
MER STA 5 - Figure 686
MER STA 6 - Figure 687

MER Station 4 (MS4):

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha=0_1 \\ MS4}} = K_{SCALE_{PM}} \left(\Delta C_{m_{\substack{\alpha=0_1 \\ MS4}}} + \Delta C_{m_{\alpha=0_1}}\right)_{\ell/c}$$

where:

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

$\Delta C_{m_{\alpha=0_1}}$ - Incremental pitching moment intercept coefficient at $M=M_1$, Figure 687.

$\Delta C_{m_{\alpha=0}}$ - Incremental pitching moment intercept coefficient at $M=M_1$ based on $\frac{\ell_{LE_F}}{c_{LOCAL}}$, Figure 696.

BREAK 2 (M_2).

MER Stations 1, 2, 3, 5 and 6 (MS1-3,5,6):

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha=0_2 \\ MS1-3,5,6}} = K_{SCALE_{PM}}\left(\Delta C_{m_{\substack{\alpha=0_2 \\ MS1-3,5,6}}} + \Delta C_{m_{\substack{\alpha=0_2 \\ INTF \\ MS1-3,5,6}}}\right)$$

where:

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

$\Delta C_{m_{\alpha=0_2}}$ - Incremental pitching moment intercept coefficient at $M=M_2$.

MER STA 1 - Figure 688
MER STA 2 - Figure 688
MER STA 3 - Figure 689
MER STA 5 - Figure 689
MER STA 6 - Figure 690

$\Delta C_{m_{\substack{\alpha=0_2 \\ INTF}}}$ Incremental pitching moment intercept coefficient at $M=M_2$ due to fuselage interference, Figure 694.

MER Station 4 (MS4)

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha=0_2 \\ MS4}} = K_{SCALE_{PM}}\left(\Delta C_{m_{\substack{\alpha=0_2 \\ MS4}}} + \Delta C_{m_{\substack{\alpha=0_2 \\ INTF \\ MS4}}} + \Delta C_{m_{\alpha=0_2}}\right)_{\ell/C}$$

where:

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

$\Delta C_{m_{\alpha=0_2}}$ - Incremental pitching moment intercept coefficient at $M=M_2$, Figure 690.

$\Delta C_{m_{\alpha=0_{2_{INTF}}}}$ - Incremental pitching moment intercept coefficient at $M=M_2$ due to fuselage interference, Figure 694.

$\Delta C_{m_{\alpha=0_2}}$ - Incremental pitching moment intercept coefficient at $M=M_2$ based on $\frac{\ell_{LE_F}}{C_{LOCAL}}$, Figure 696.

BREAK 3 (M_3):

MER Stations 2 and 6 (MS2,6):

$$\Delta\left(\frac{PM}{q}\right)_{\alpha=0_3} = K_{SCALE_{PM}} \left(\Delta C_{m_{\alpha=0_3}} + \Delta C_{m_{\alpha=0_3}}\right)$$
$$\text{MS2,6} \qquad\qquad \text{MS2,6} \qquad\qquad \text{INTF MS2,6}$$

where:

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

$\Delta C_{m_{\alpha=0_3}}$ - Incremental pitching moment intercept coefficient at $M=M_3$.

MER STA 2 - Figure 691
MER STA 6 - Figure 693

$\Delta C_{m_{\alpha=0_3}}$ - Incremental pitching moment intercept coefficient at $M=M_3$ due to fuselage interference, Figure 695.
INTF

MER Stations 1, 3, 4 and 5 (MS1,3,4,5)

$$\Delta\left(\frac{PM}{q}\right)_{\alpha=0} = K_{SCALE_{PM}} \left(\Delta C_{m_{\alpha=0_3}} + \Delta C_{m_{\alpha=0_3}} + \Delta C_{m_{\alpha=0_3}}\right)$$
$$\text{MS1,3,4,5} \qquad\qquad \text{MS1,3,4,5} \qquad\qquad \text{INTF MS1,3,4,5} \qquad\qquad \ell/C \text{ MS1,3,4,5}$$

where:

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

$\Delta C_{m_{\alpha=0_3}}$ - Incremental pitching moment intercept coefficient at $M=M_3$.

MER STA 1 - Figure 691
MER STA 3 - Figure 692
MER STA 4 - Figure 693
MER STA 5 - Figure 692

$\Delta C_{m_{\alpha=0_3}}$ $_{INTF}$ - Incremental pitching moment intercept coefficient at $M=M_3$ due to fuselage interference, Figure 695.

$\Delta C_{m_{\alpha=0_3}}$ $_{MS1,3,4,5}^{\ell/C}$ - Incremental pitching moment intercept coefficient at $M=M_3$ based on $\frac{\ell_{LE_A}}{C_{LOCAL}}$.

MER STA 1 - Figure 697
MER STA 3 - Figure 697
MER STA 4 - Figure 696
MER STA 5 - Figure 697

With the incremental pitching moment intercepts known at each break point, the calculation of $\left(\frac{PM}{q}\right)_{\alpha=0}$ at M=x is possible for each MER station. The computation is based on a linear variation of $\left(\frac{PM}{q}\right)_{\alpha=0}$ between the break points where M=x occurs. From Figure 682, 683 and 684 determine between which break points M=x occurs for the subject MER station. Designate these as M_{LOW} and M_{HI} such that $M_{LOW} \leq x < M_{HI}$. If $x \leq M_o$, use the value of $\left(\frac{PM}{q}\right)_{\alpha=0}$ predicted in Subsection 4.4.1.3. Using the equation below $\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ M=x \\ MS1-6}}$ can be computed.

$$\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ M=x \\ MS1-6}} = \left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ PRED \\ MS1-6}} + \left[\Delta\left(\frac{PM}{q}\right)_{m_{\substack{\alpha=0 \\ LOW \\ MS1-6}}} + \left(\frac{x-M_{LOW}}{M_{HI}-M_{LOW}}\right) \Delta\left(\frac{PM}{q}\right)_{m_{\substack{\alpha=0 \\ HI \\ MS1-6}}} - \Delta\left(\frac{PM}{q}\right)_{m_{\substack{\alpha=0 \\ LOW \\ MS1-6}}} \right]$$

A similar computational procedure is included in Subsection 4.2.1.2.

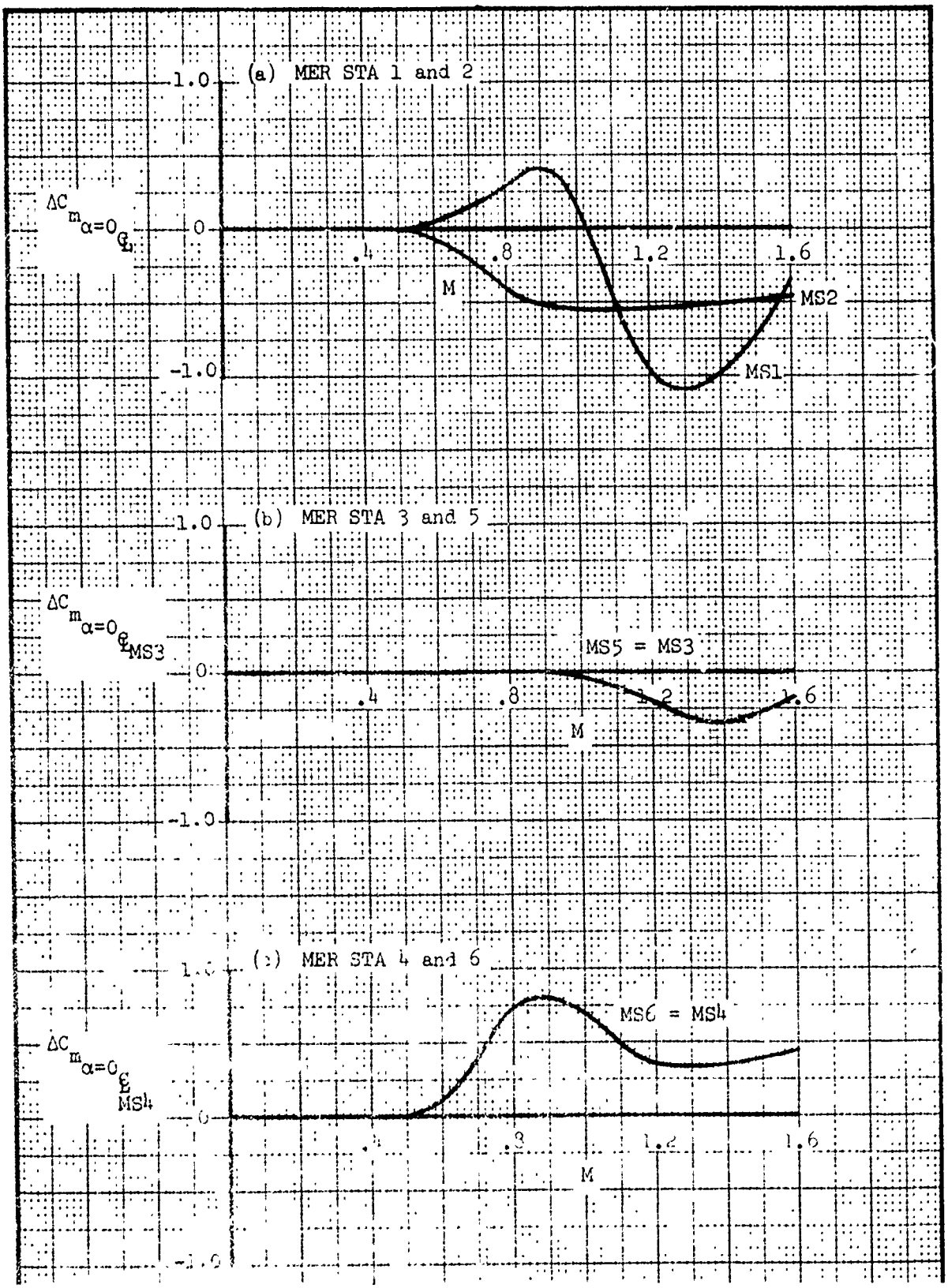


Figure 681. Pitching Moment Intercept - Mach Number Corrections for Stores Mounted on Fuselage Centerline, MER Stations 1-6

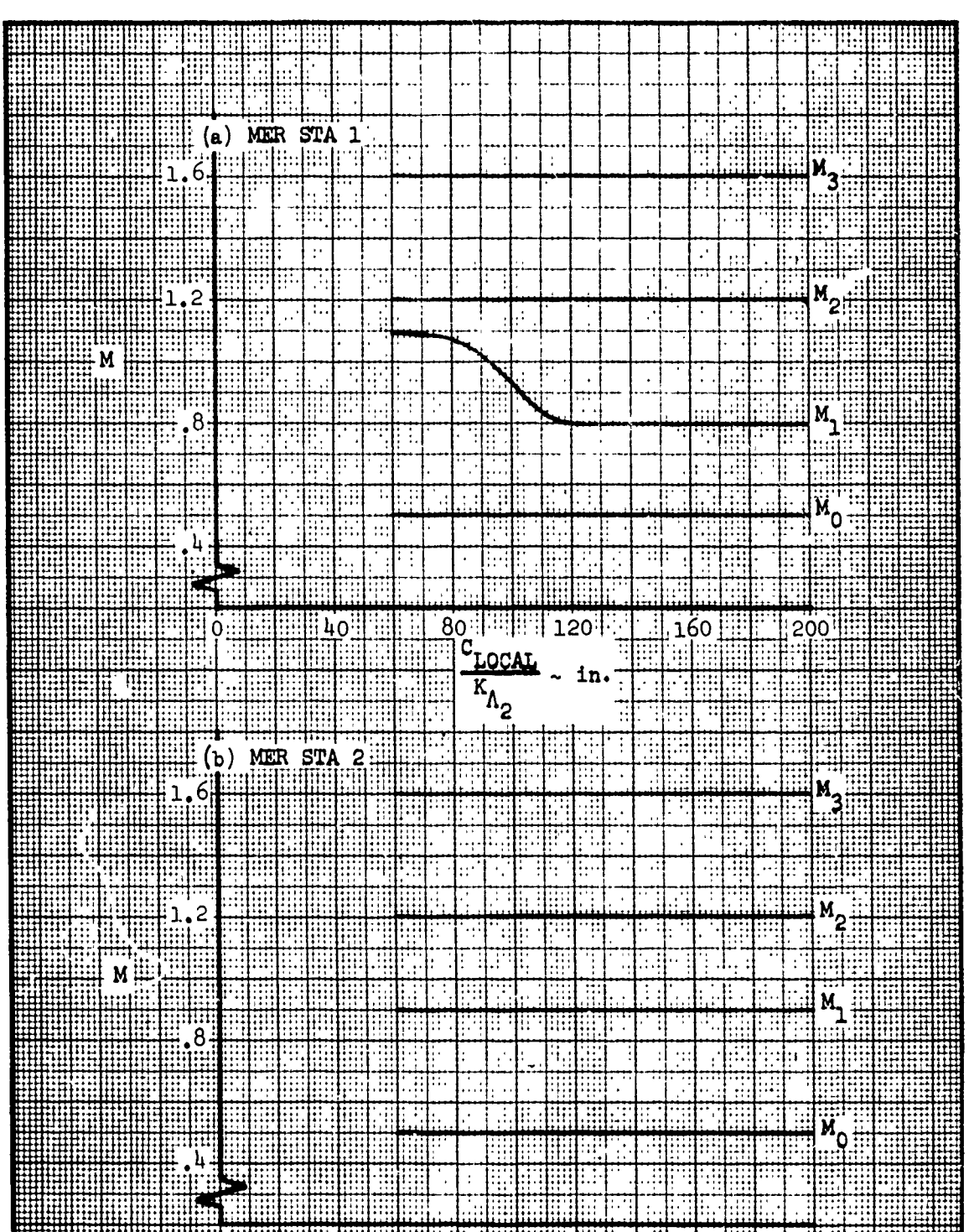


Figure 682. Pitching Moment Intercept - Mach Number Break Points for MER Stations 1 and 2

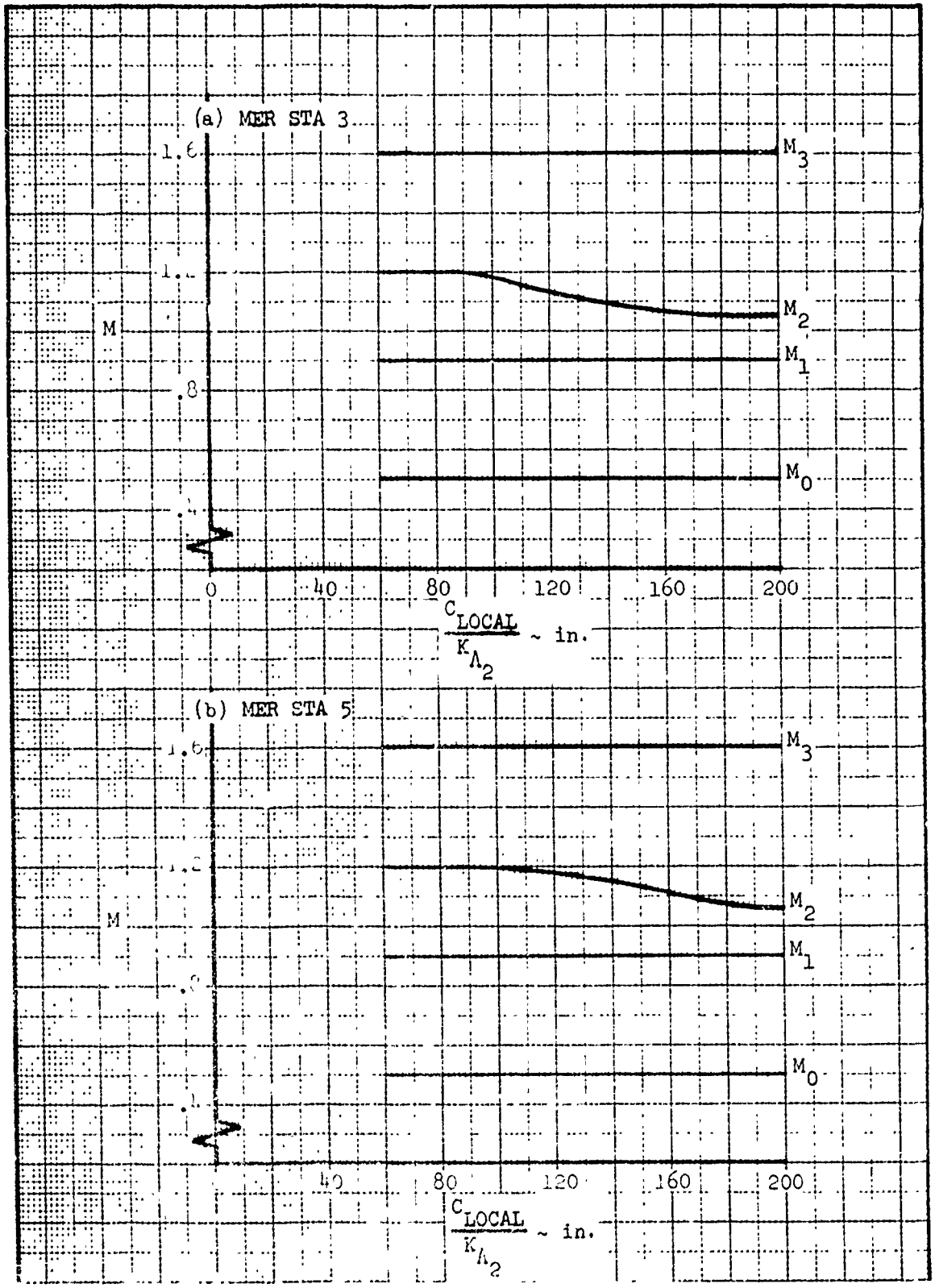


Figure 68: Pitching Moment Intercept - Mach Number Break Points for MER Stations 3 and 5

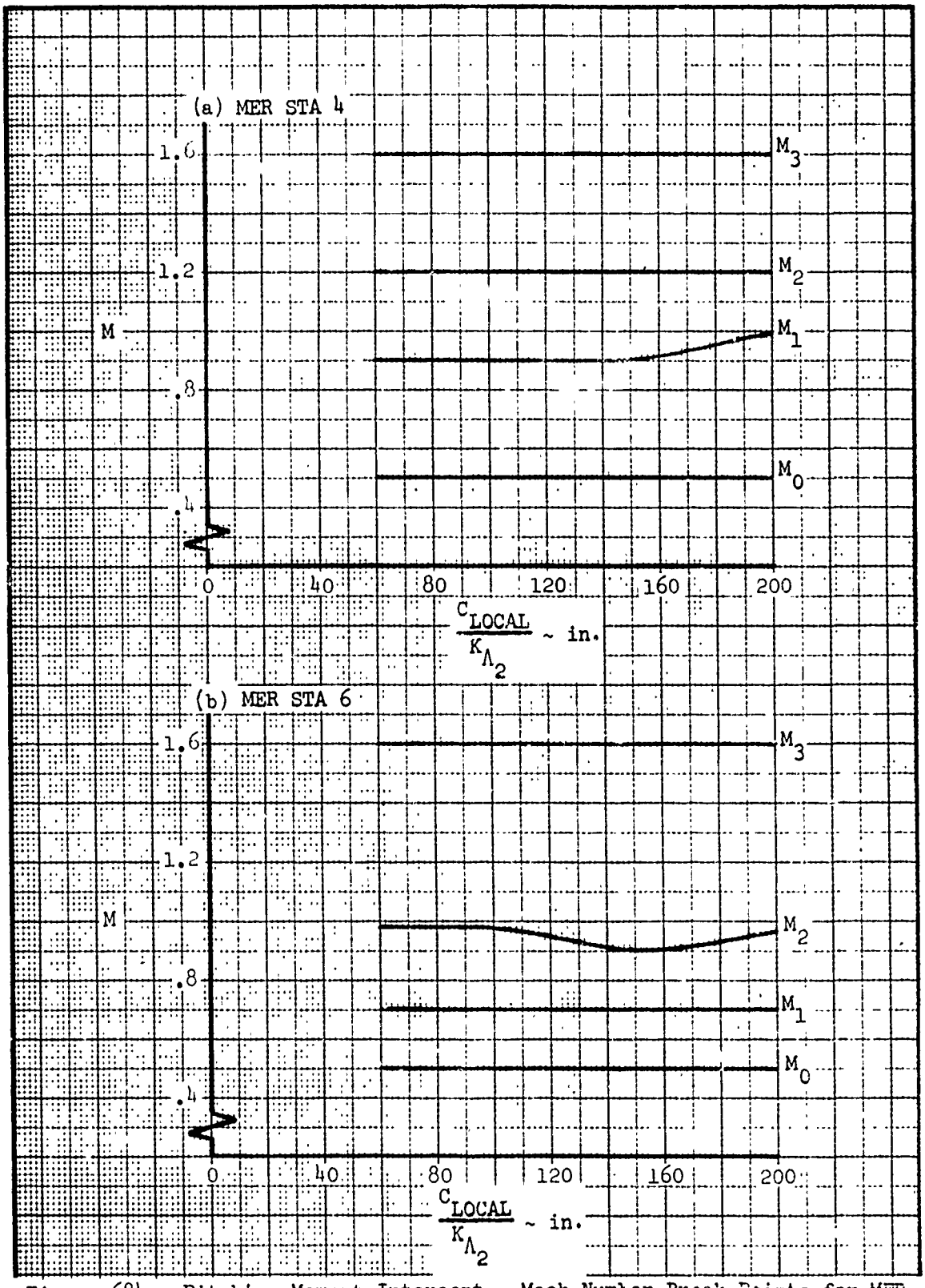


Figure 684. Pitching Moment Intercept - Mach Number Break Points for MER Stations 4 and 6

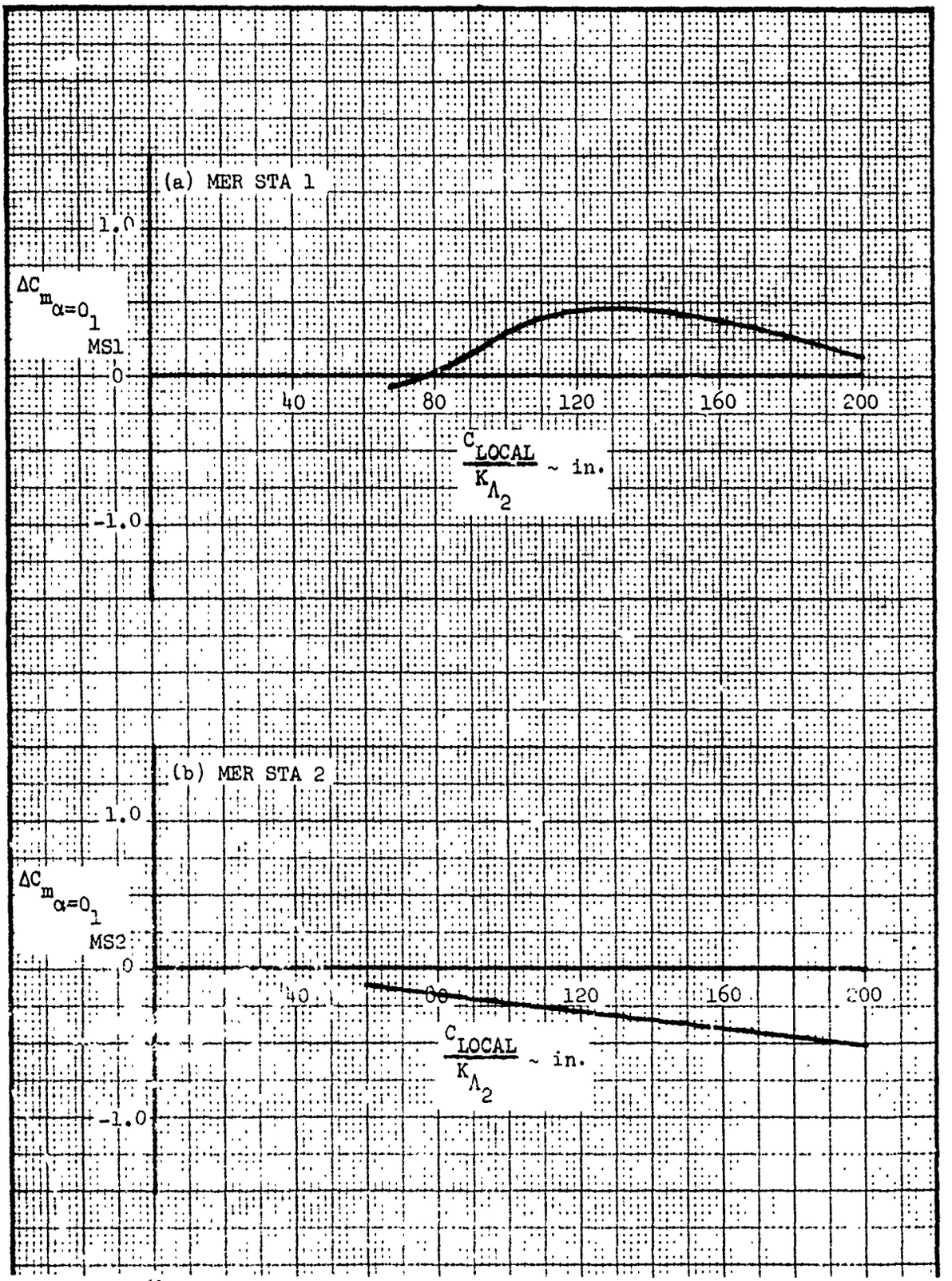


Figure 685. Pitching Moment Intercept - Incremental Coefficient at Mach Break 1 for MER Stations 1 and 2

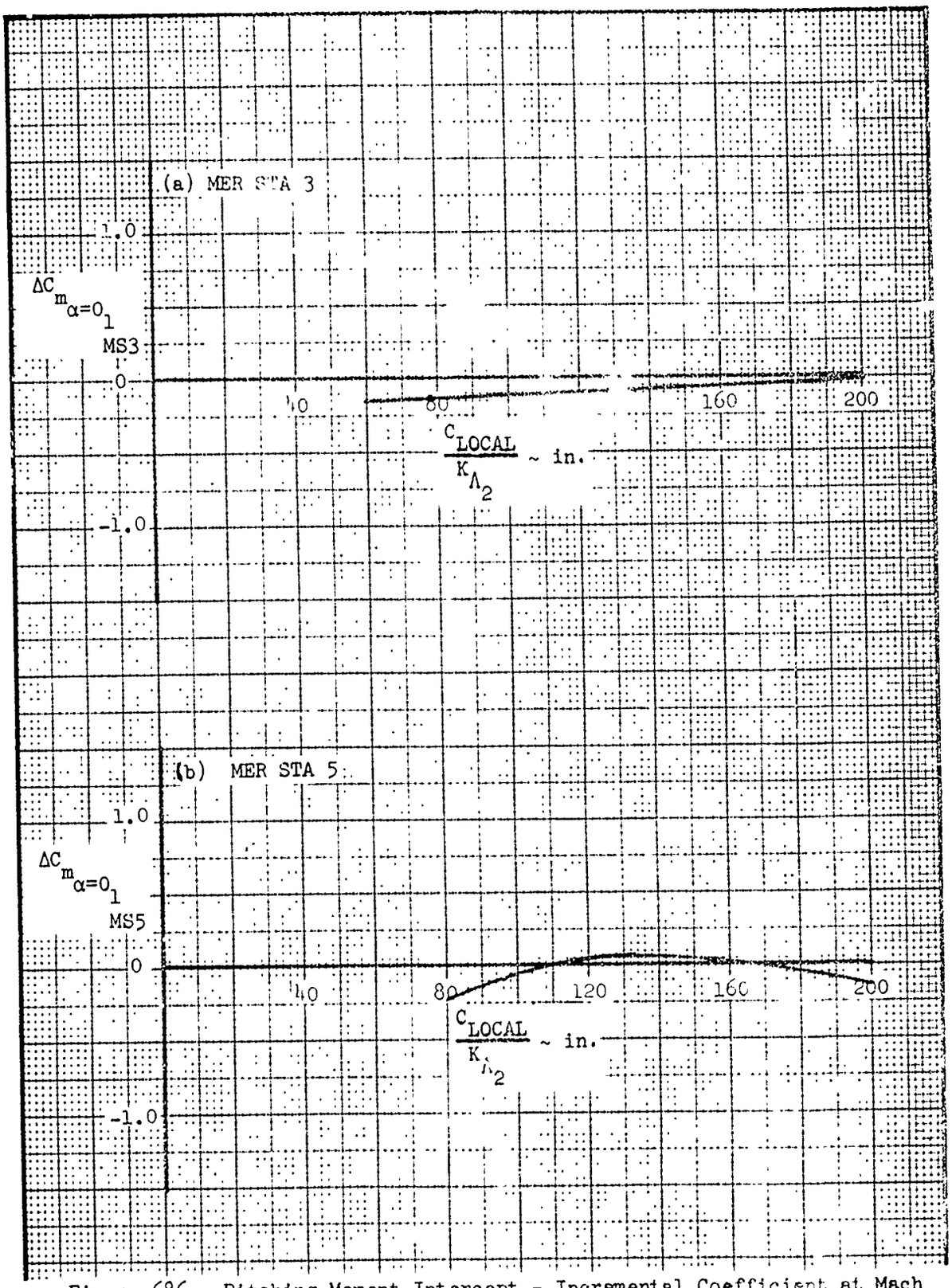


Figure 686. Pitching Moment Intercept - Incremental Coefficient at Mach Break 1 for MER Stations 3 and 5

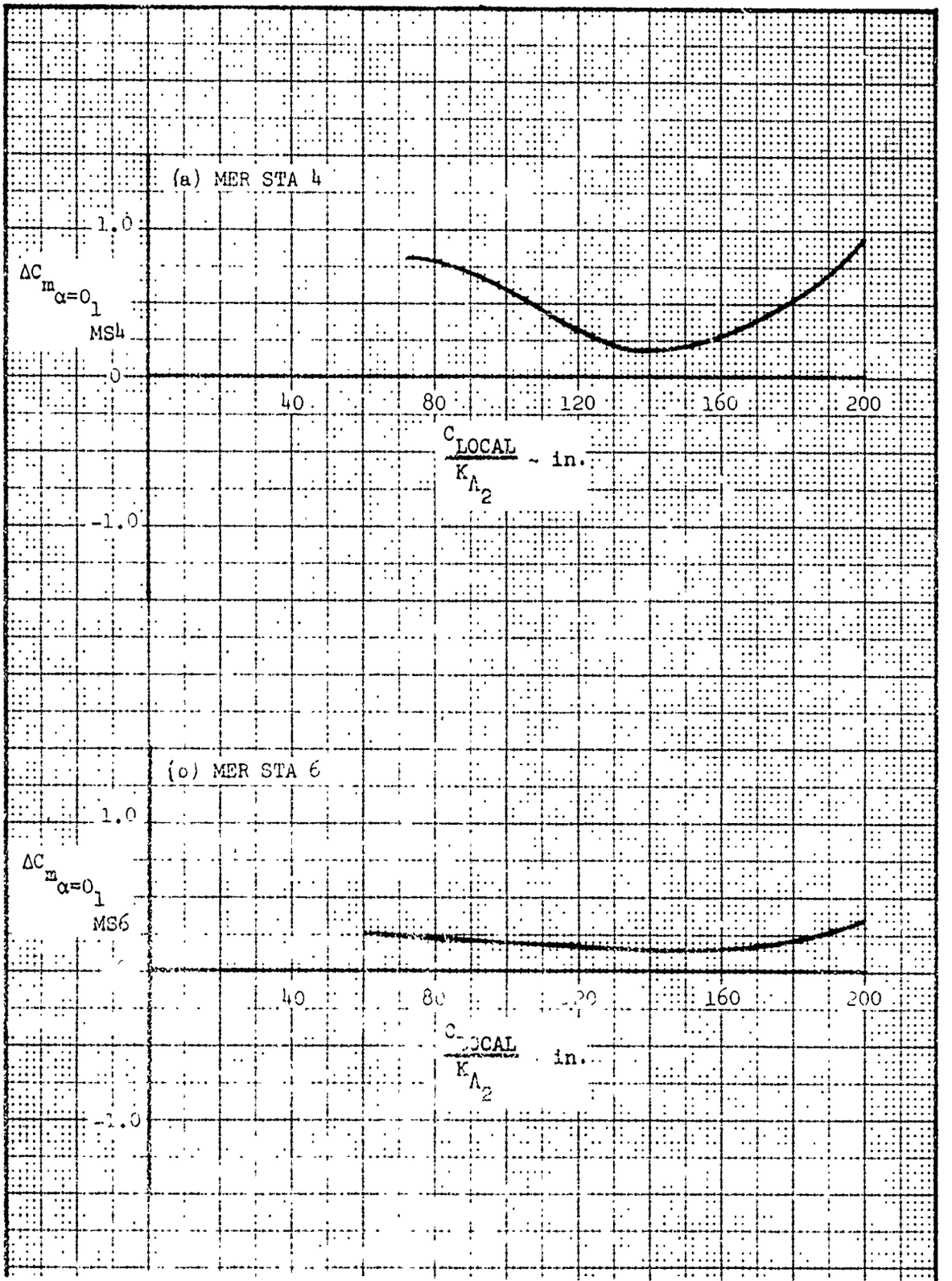


Figure 62. Pitching Moment Increment - Incremental Coefficient at Mach Break 1 for MER Stations 4 and 6

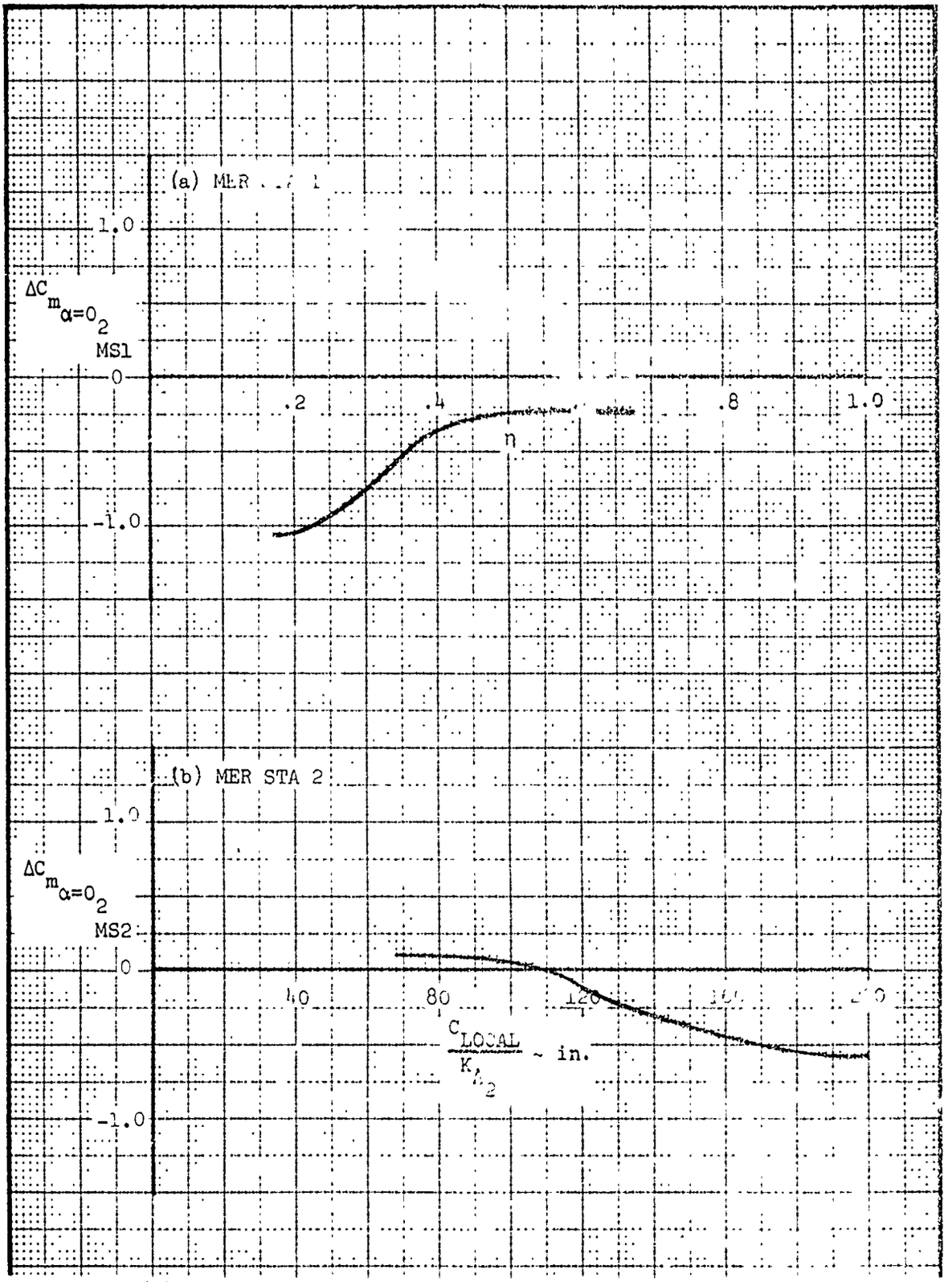


Figure 688. Pitching Moment Intercept - Incremental Coefficient at Mach Break 2 for MER Stations 1 and 2

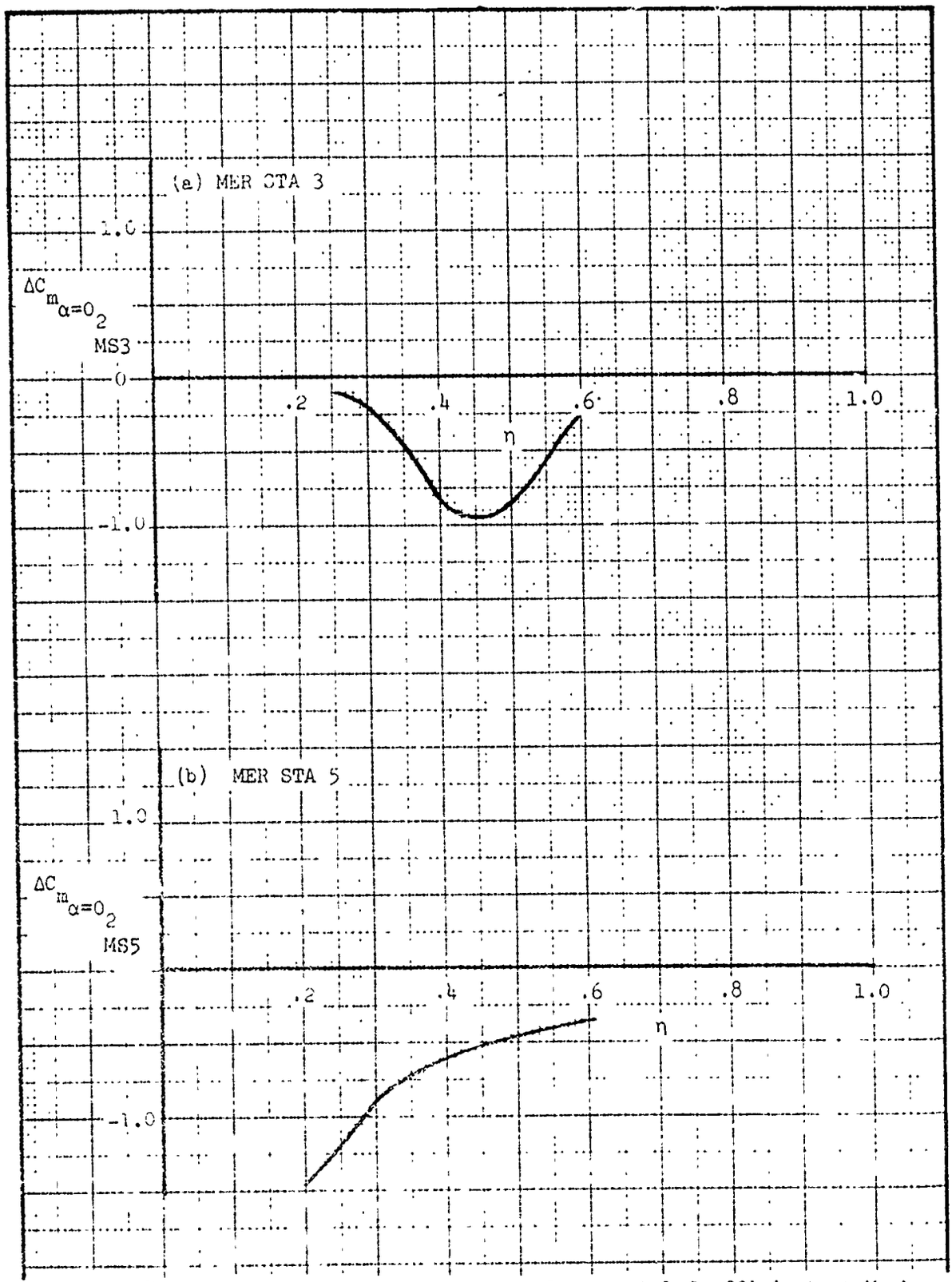


Figure 66. Pitching Moment Intercept - Incremental Coefficient at Mach Break for MER Stations 3 and 5

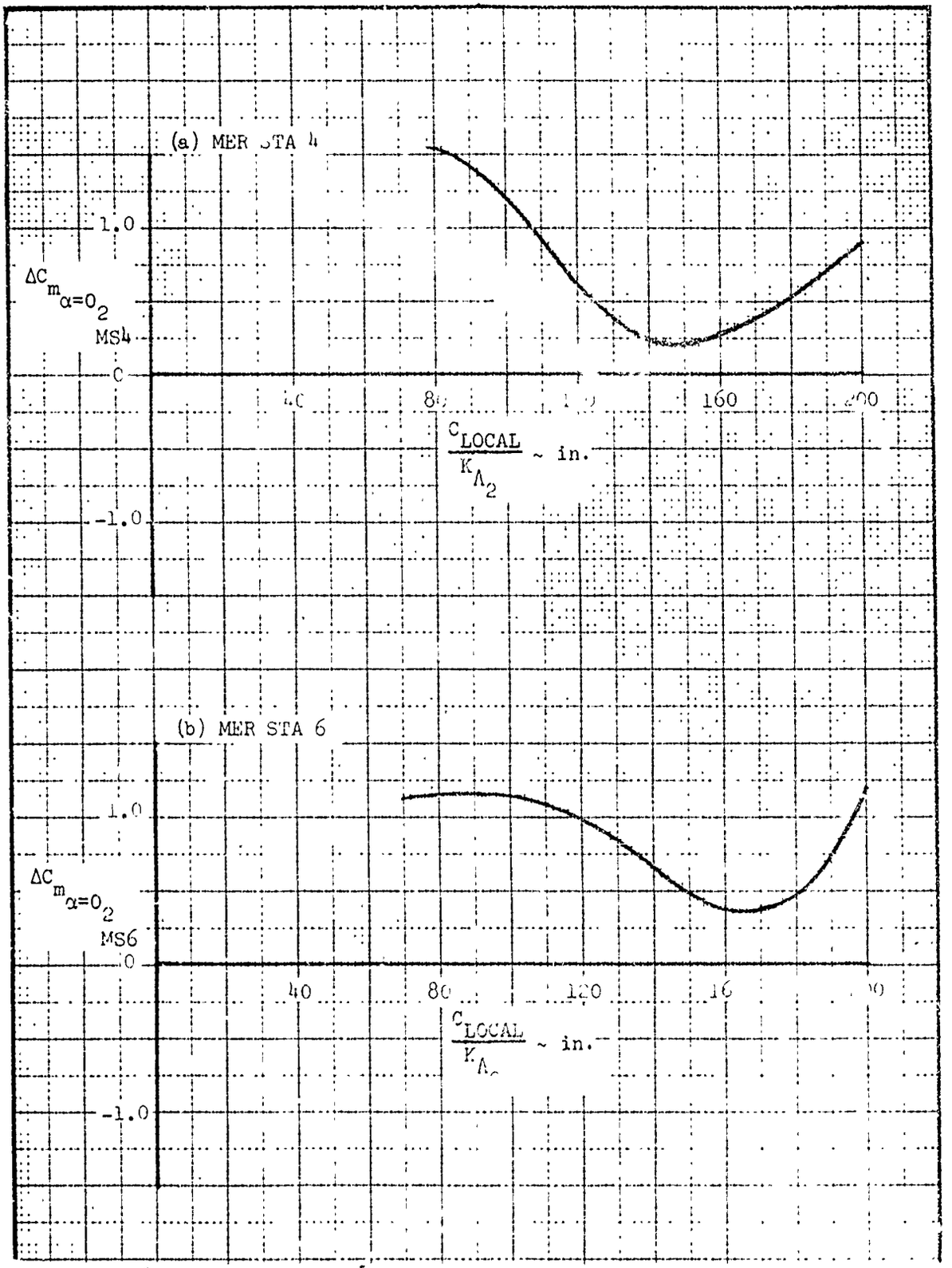


Figure 690. Pitching Moment Intercept - Incremental Coefficient at α_2 Break 2 for MER Stations 4 and 6

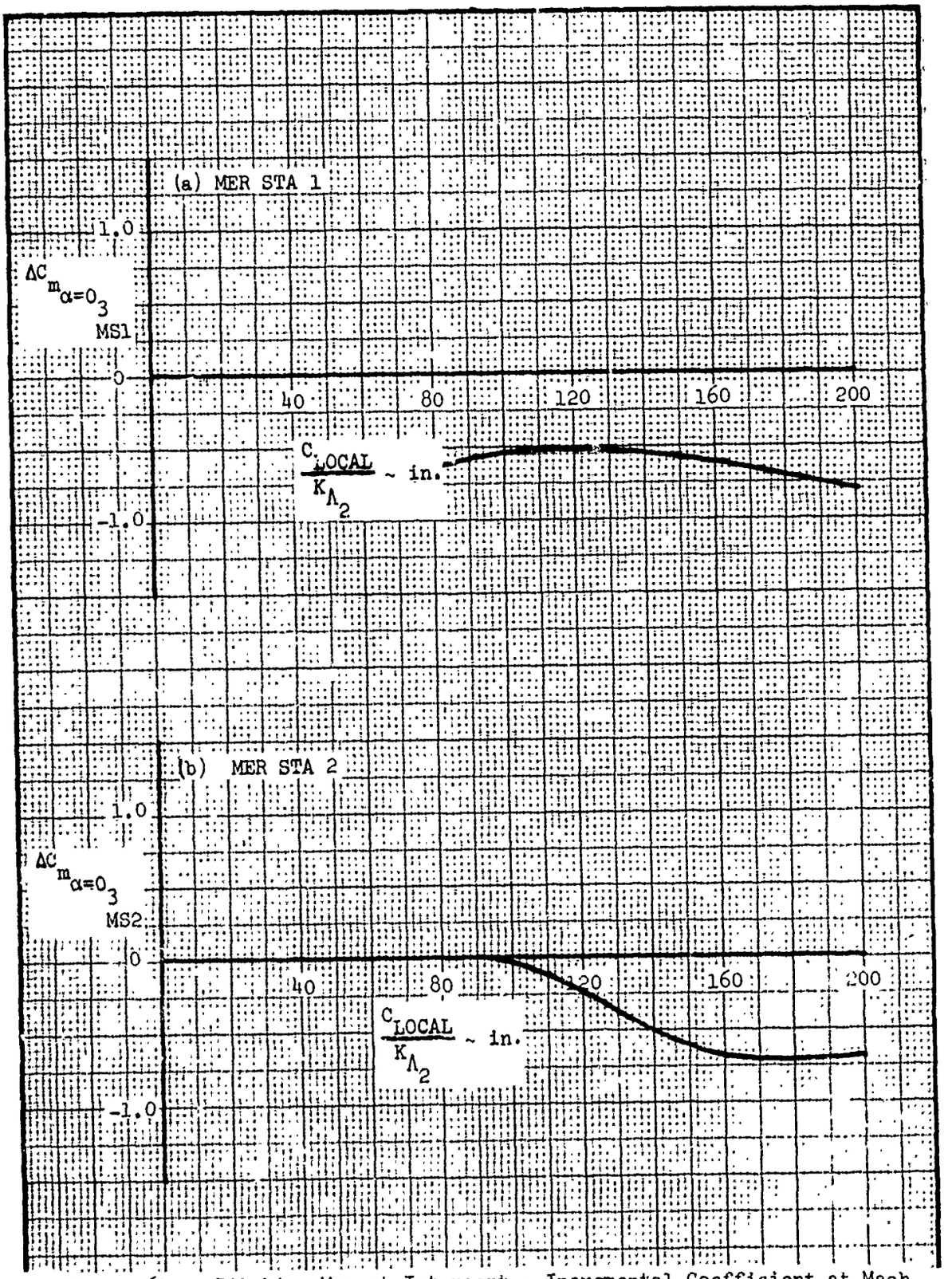


Figure 691. Pitching Moment Intercept - Incremental Coefficient at Mach Break 3 for MER Stations 1 and 2

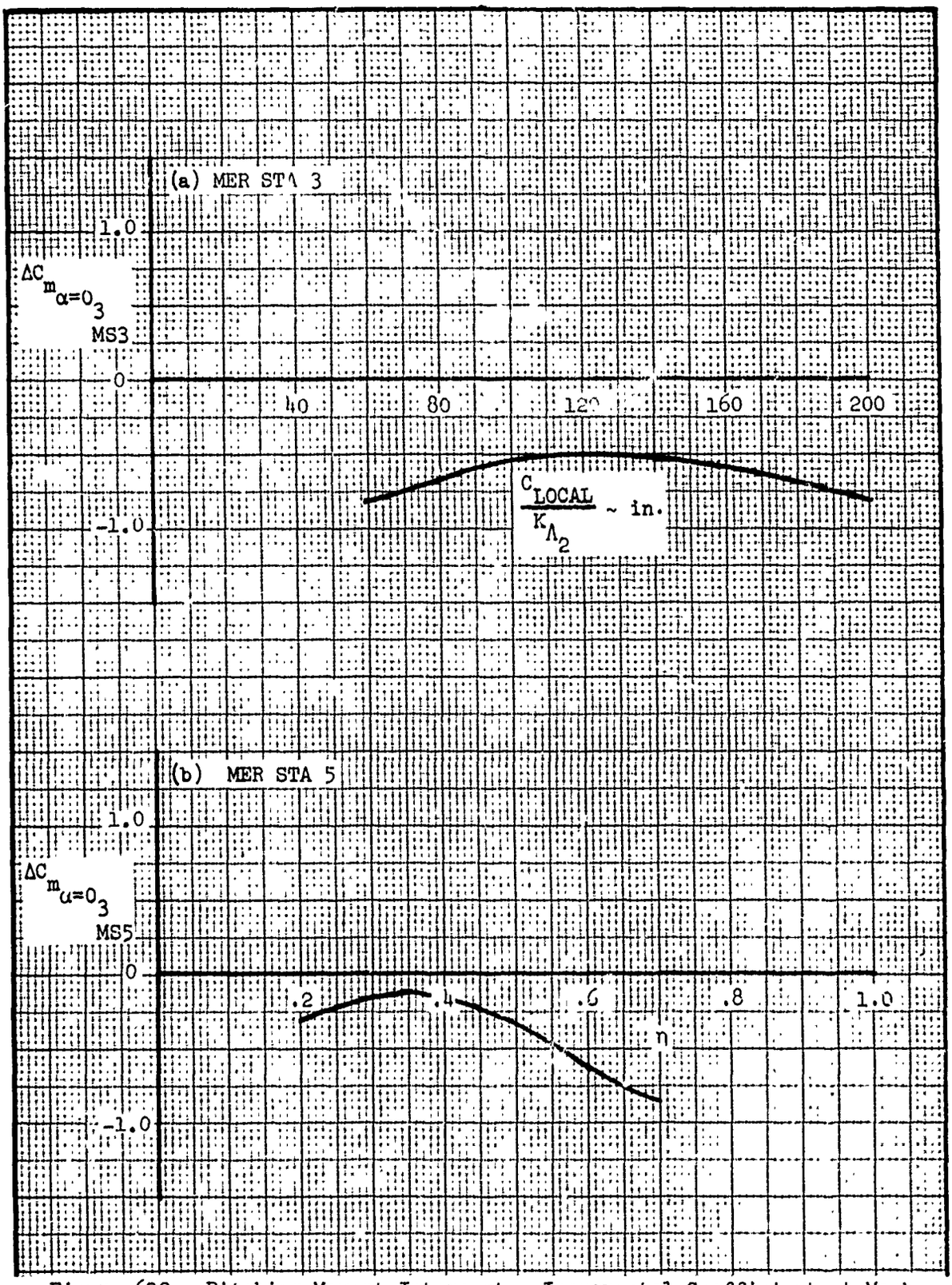


Figure 692. Pitching Moment Intercept - Incremental Coefficient at Mach Break 3 for MER Stations 3 and 5

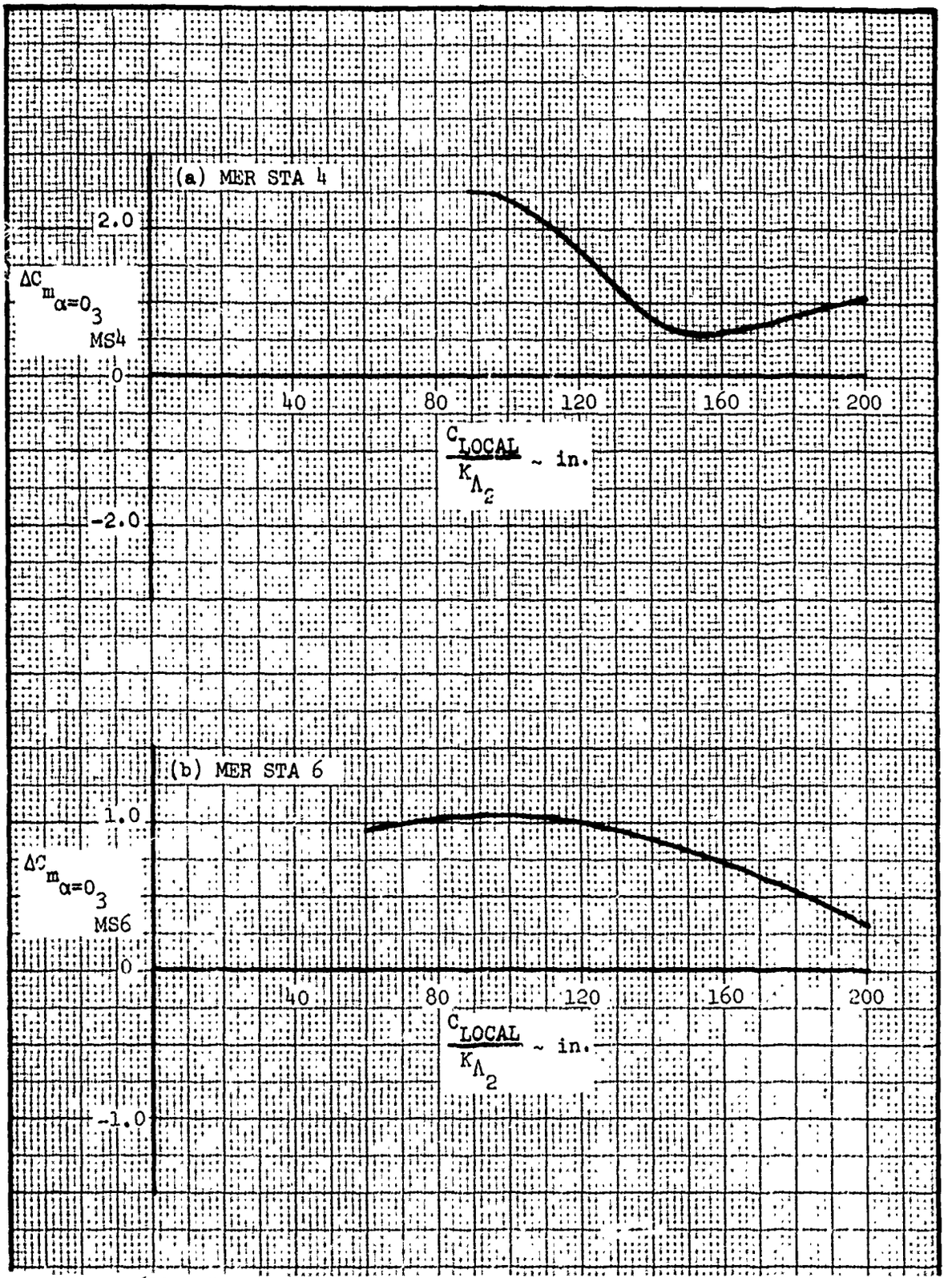


Figure 693. Pitching Moment Intercept - Incremental Coefficient at Mach Break 3 for MER Stations 4 and 6

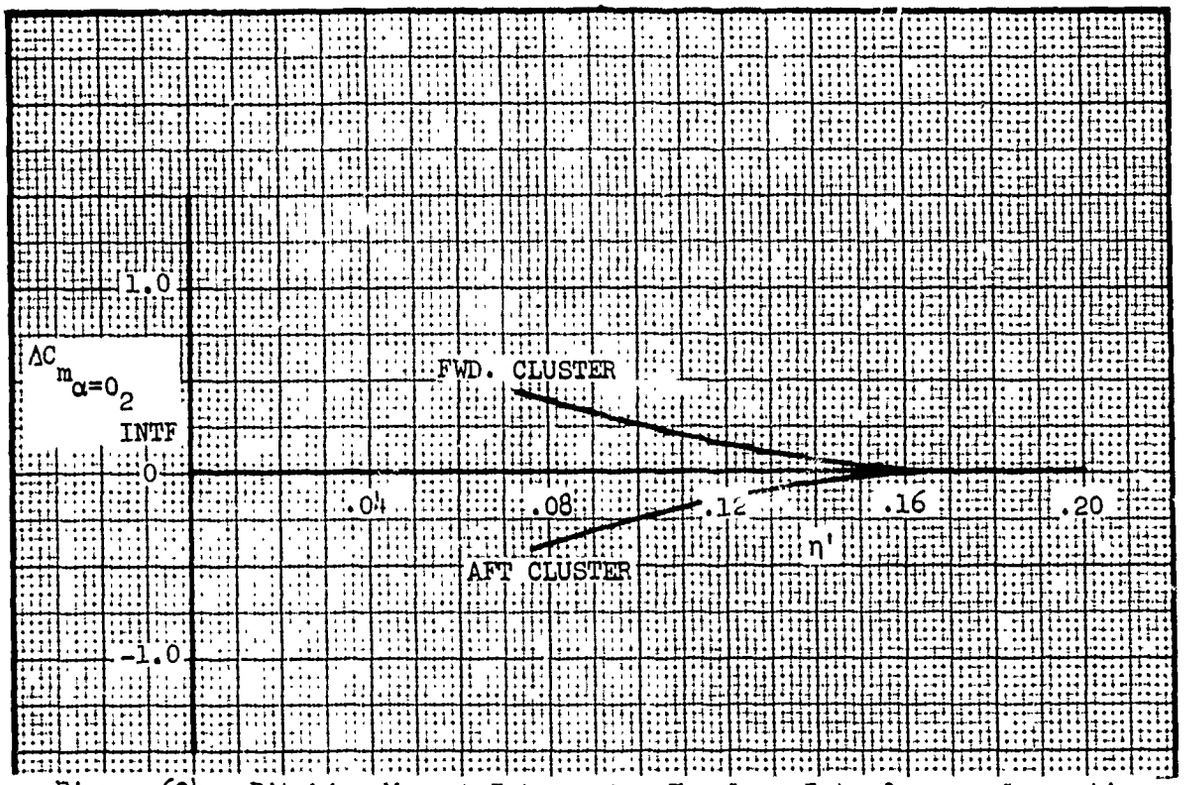


Figure 694. Pitching Moment Intercept - Fuselage Interference Correction at Mach Break 2 for MER Stations 1-6

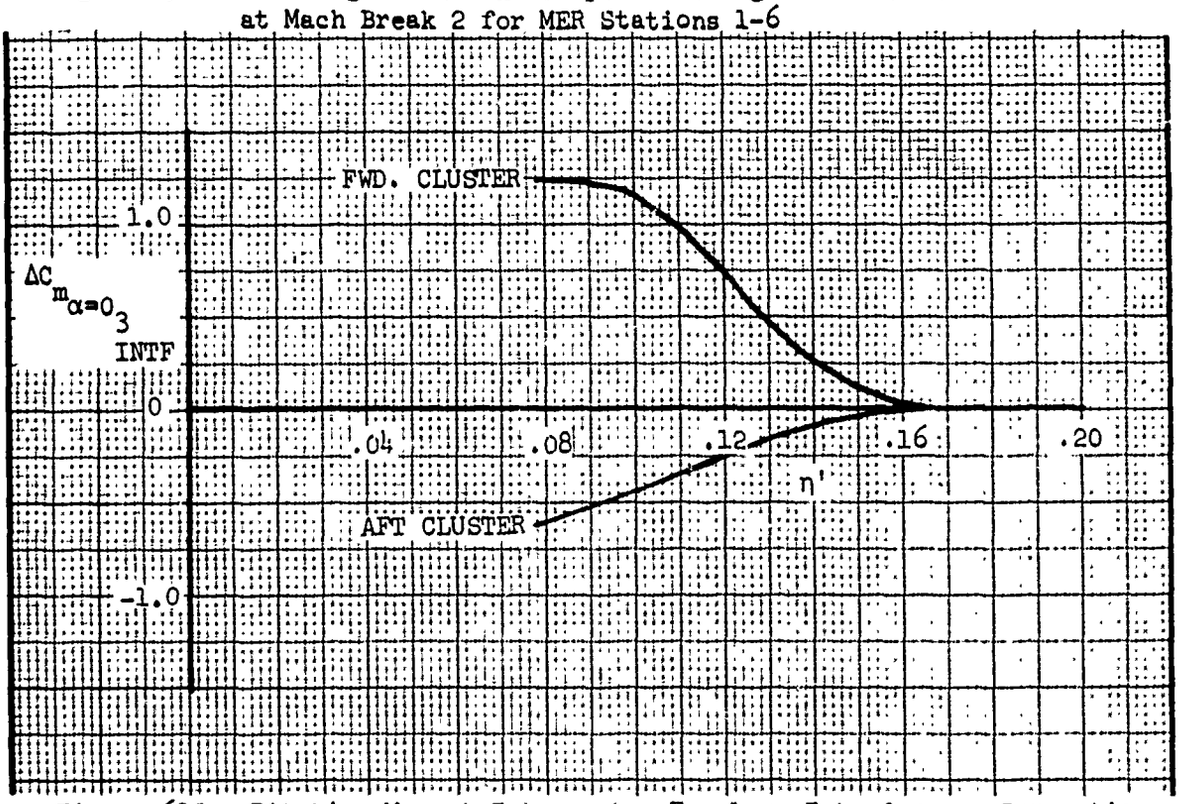


Figure 695. Pitching Moment Intercept - Fuselage Interference Correction at Mach Break 3 for MER Stations 1-6

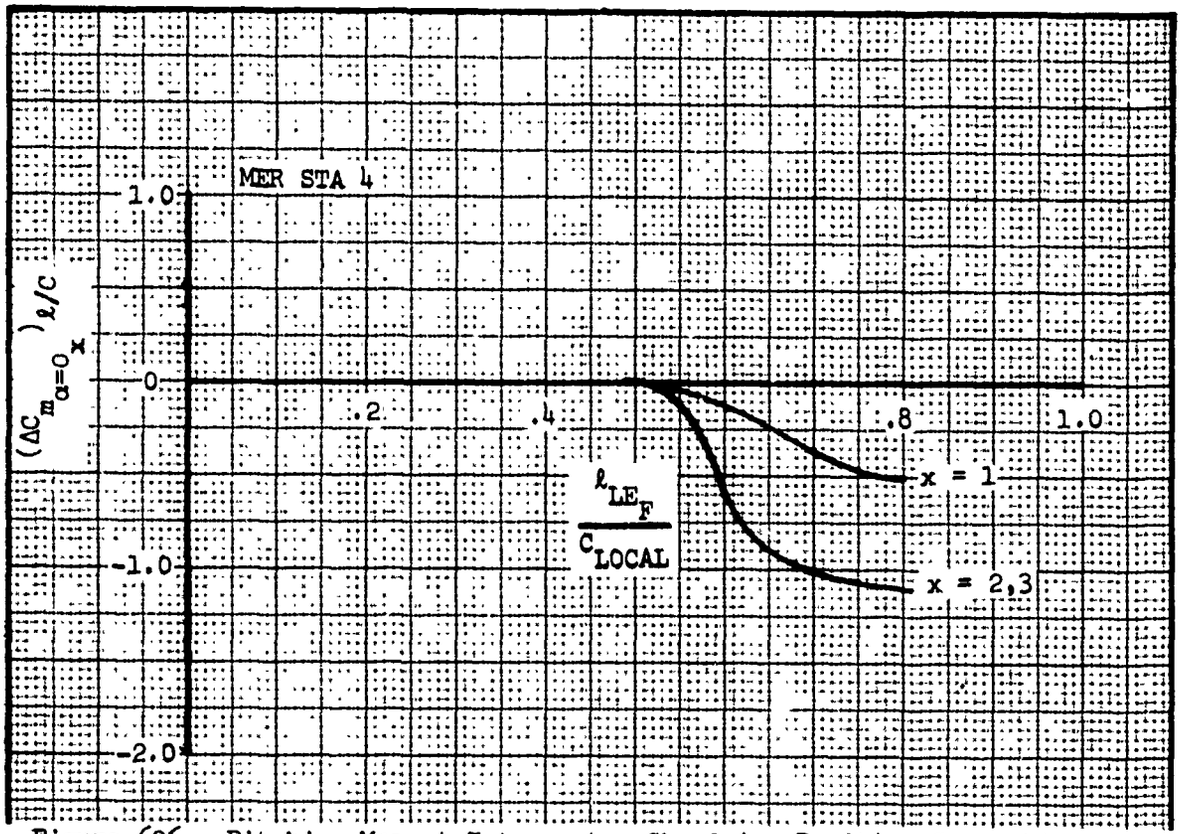


Figure 696. Pitching Moment Intercept - Chordwise Position Correction for MER Station 4

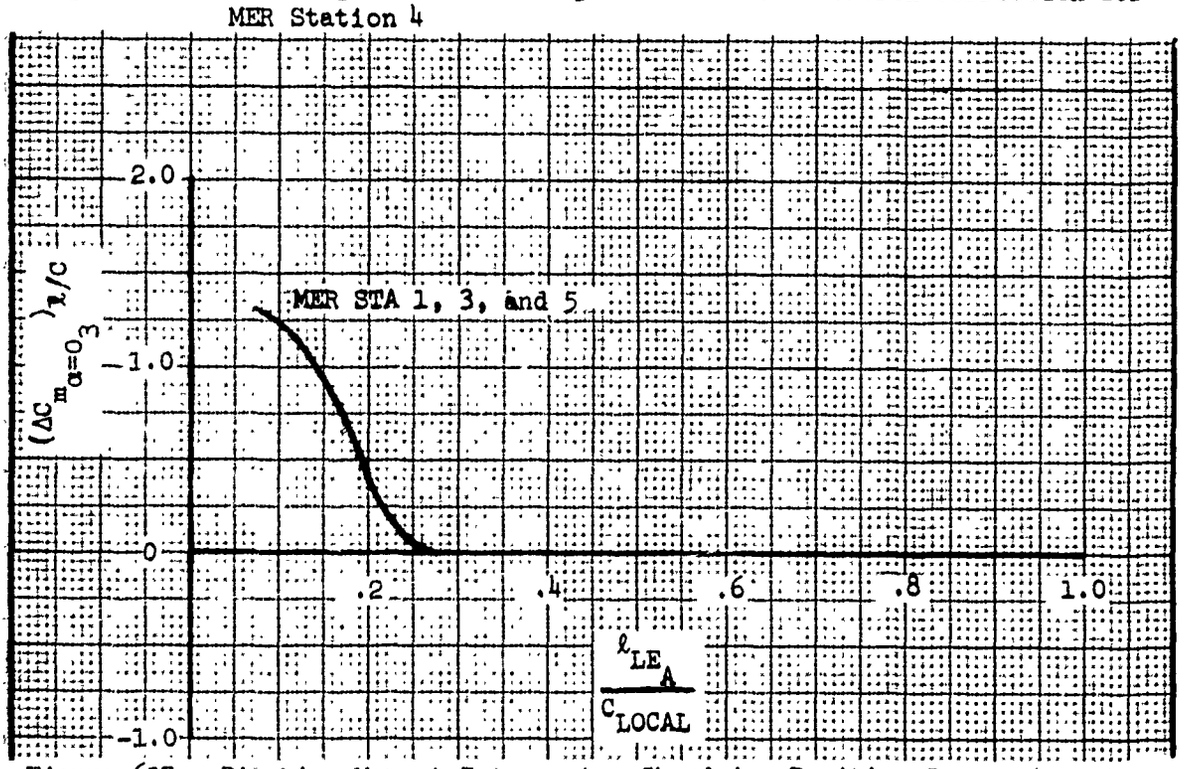


Figure 697. Pitching Moment Intercept - Chordwise Position Correction at Mach Break 3 for MER Stations 1,3 and 5

4.4.2 Increment - Aircraft Yaw

The captive store incremental pitching moment due to aircraft yaw is obtained as the difference between the yawed pitch polar and the zero-yaw pitch polar data as outlined in Section The incremental pitching moment slope, $\Delta\left(\frac{PM}{q}\right)_{\alpha}$ and intercept, $\Delta\left(\frac{PM}{q}\right)_{\alpha=0}$, thus obtained are linear with aircraft yaw angle; therefore, the incremental slope and intercept equations are derived and presented per degree of store yaw angle, β. The incremental airloads due to aircraft yaw are referenced to the coordinate system presented in Subsection 2.3.1.2.

To compute the incremental pitching moment slope, $\Delta\left(\frac{PM}{q}\right)_{\alpha}$, the following equation is used.

$$\Delta\left(\frac{PM}{q}\right)_{\alpha} = \Delta\left(\frac{PM}{q}\right)_{\alpha_{\beta}} \cdot \beta$$

where:

$\Delta\left(\frac{PM}{q}\right)_{\alpha_{\beta}}$ - Incremental pitching moment slope per degree β as obtained by the methods presented in the following sections, $\frac{ft^3}{deg^2}$.

β - Store yaw angle, deg., equal to $+\Psi_{A/C}$ for right wing store installations or $-\Psi_{A/C}$ for left wing store installations.

The equation and procedure for computing the incremental pitching moment intercept, $\Delta\left(\frac{PM}{q}\right)_{\alpha=0}$, due to aircraft yaw is similar to the above presentation for incremental pitching moment slope.

4.4.2.1 Slope Prediction

The incremental pitching moment slope prediction is divided into two sections, fuselage centerline-mounted stores and wing-mounted stores. The technique presented in this section covers the Mach number range 0.5 to 1.6.

FUSELAGE CENTERLINE-MOUNTED STORES

MER STATIONS 1-6 (MS1-6):

$$\Delta\left(\frac{PM}{q}\right)_{\alpha_{\beta_{\ell}}} = \left(\Delta C_{m_{\alpha_{\beta_{\ell}}}}\right)_{MS1-6} K_{SCALE_{PM}}$$

where:

$\Delta C_{m_{\alpha_{\beta_{\ell}}}}$ - Incremental $C_{m_{\alpha_{\beta}}}$ presented as a function of Mach number, $\frac{1}{deg^2}$.

MER STA 1 - Figure 698
MER STA 2 - Figure 699
MER STA 3 - Figure 698
MER STA 4 - Figure 699
MER STA 5 - Figure 698
MER STA 6 - Figure 699

$K_{SCALE_{PM}}$ - Defined in Section IV, ft^3.

WING-MOUNTED STORES

MER STATIONS 1,3, and 5 (MS1,3,5):

$$\Delta\left(\frac{PM}{q}\right)_{\alpha_{\beta_{MS1,3,5}}} = \left(\Delta C_{m_{\alpha_{\beta_{MS1,3,5}}}} + K_{\ell_{\frac{LE_A}{C}}} \Delta C_{m_{\alpha_{\beta_{\ell_{\frac{LE_A}{C}}}}}}\right) K_{SCALE_{PM}}$$

where:

$\Delta C_{m_{\alpha_{\beta}}}$ - Incremental $C_{m_{\alpha}}$ per degree β presented as a function of wing spanwise position for Mach numbers 0.7, 0.9, 1.05, 1.2, and 1.6, $\frac{1}{deg^2}$, Table 19.

$K_{\frac{\ell_{LE_A}}{C}}$ - Proportioning factor based on the distance from the wing leading edge to the nose of the store on MER STATION 1 measured in the wing plan view divided by the local wing chord, positive, Figure 710.

$\Delta C_{m_{\alpha_\beta}}$ - Incremental C_{m_α} per degree β based on ℓ_{LE_A}/C defined above and presented as a function of Mach number, $\frac{1}{deg^2}$.

MER STA 1 - Figure 711

MER STA 3 - Figure 711

MER STA 5 - Figure 711

$K_{SCALE_{PM}}$ - Defined in Section IV, ft^3.

MER STATIONS 2,4, and 6 (MS2,4,6):

$$\Delta\left(\frac{PM}{q}\right)_{\alpha_\beta}_{MS2,4,6} = \left(\Delta C_{m_{\alpha_\beta}}\right)_{MS2,4,6} K_{SCALE_{PM}}$$

where:

$\Delta C_{m_{\alpha_\beta}}$ - Incremental C_{m_α} per degree β presented as a function of wing spanwise position for Mach numbers 0.7, 0.9, 1.05, 1.2, and 1.6, $\frac{1}{deg^2}$, Table 19.

$K_{SCALE_{PM}}$ - Defined in Section IV, ft^3.

The variation of $\Delta C_{m_{\alpha_\beta}}$ for MER STATIONS 1 - 6 is presented at distinct Mach numbers of 0.7, 0.9, 1.05, 1.2, and 1.6. Table 19

presented below is a guide for locating the curves for $\Delta C_{m_{\alpha_\beta}}$ for each MER STATION at the Mach numbers indicated above. For Mach numbers between 0.5 and 0.7, the value at M = 0.7 should be used in the computation. For Mach numbers between 0.7 and 1.6 other than those distinctly presented, linear interpolation should be used between the appropriate Mach numbers to obtain the required value for computation.

TABLE 19. INCREMENTAL PITCHING MOMENT SLOPE COEFFICIENT DUE TO YAW - FIGURE LOCATION GUIDE

$\Delta C_{m_{\alpha_\beta}}$	MACH NUMBER				
	0.7	0.9	1.05	1.2	1.6
	Figure Numbers				
MER STA 1	700	702	704	706	708
MER STA 2	701	703	705	707	709
MER STA 3	700	702	704	706	708
MER STA 4	701	703	705	707	709
MER STA 5	700	702	704	706	708
MER STA 6	701	703	705	707	709

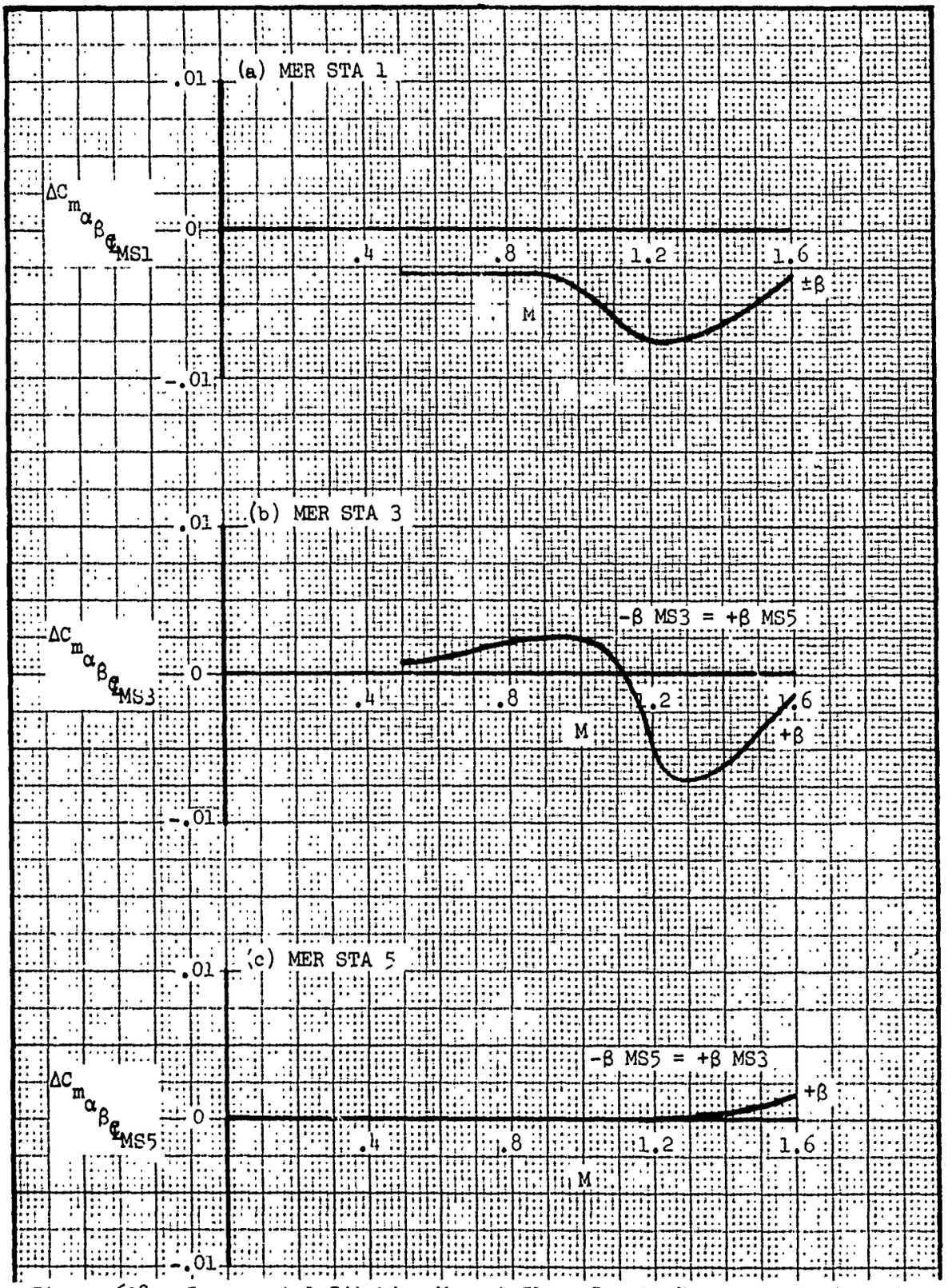


Figure 698. Incremental Pitching Moment Slope Due to Yaw - Coefficient for Stores Mounted on Fuselage Centerline, MER Stations 1,3, and 5

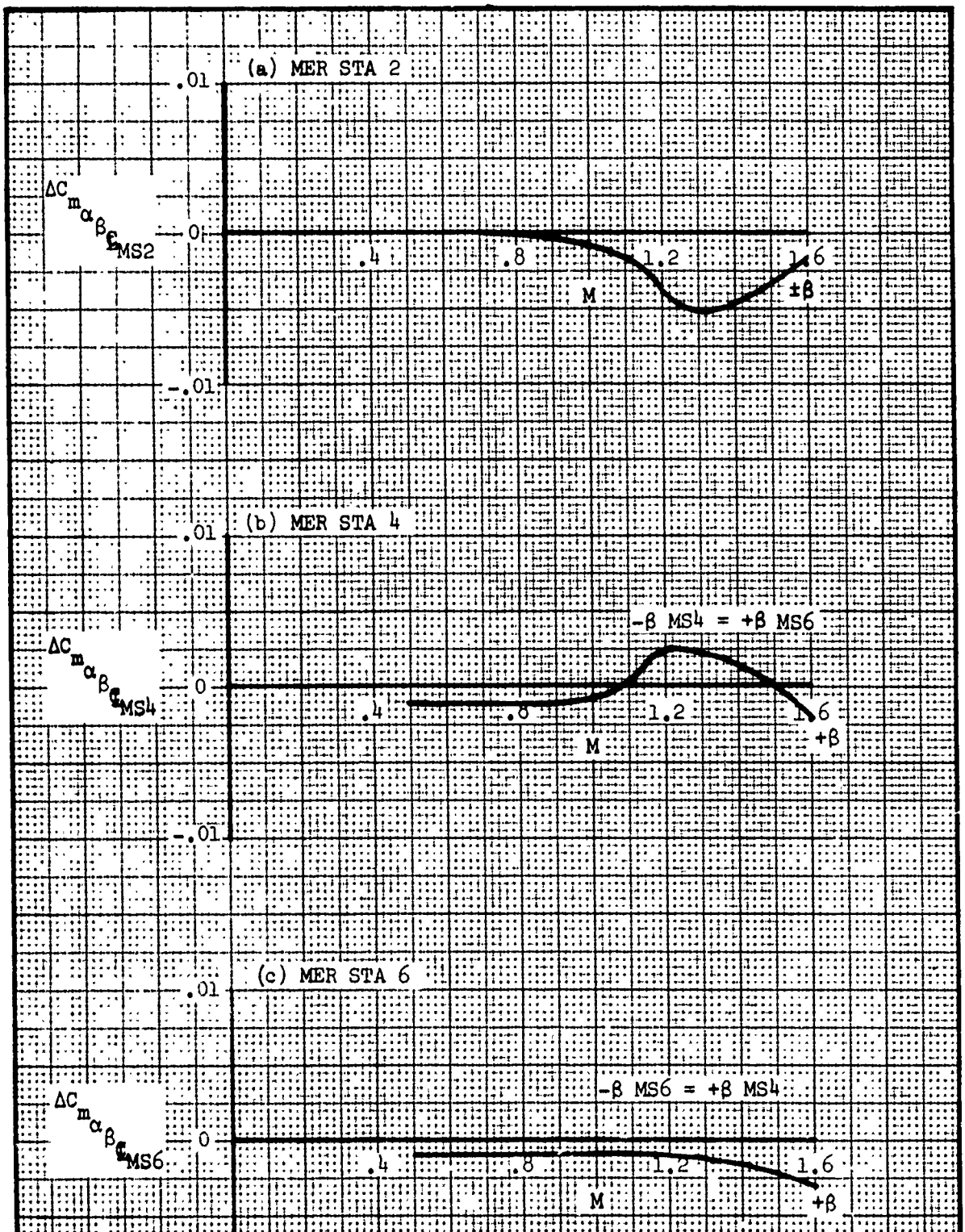


Figure 699. Incremental Pitching Moment Slope Due to Yaw - Coefficient for Stores Mounted on Fuselage Centerline, MER Stations 2, 4, and 6

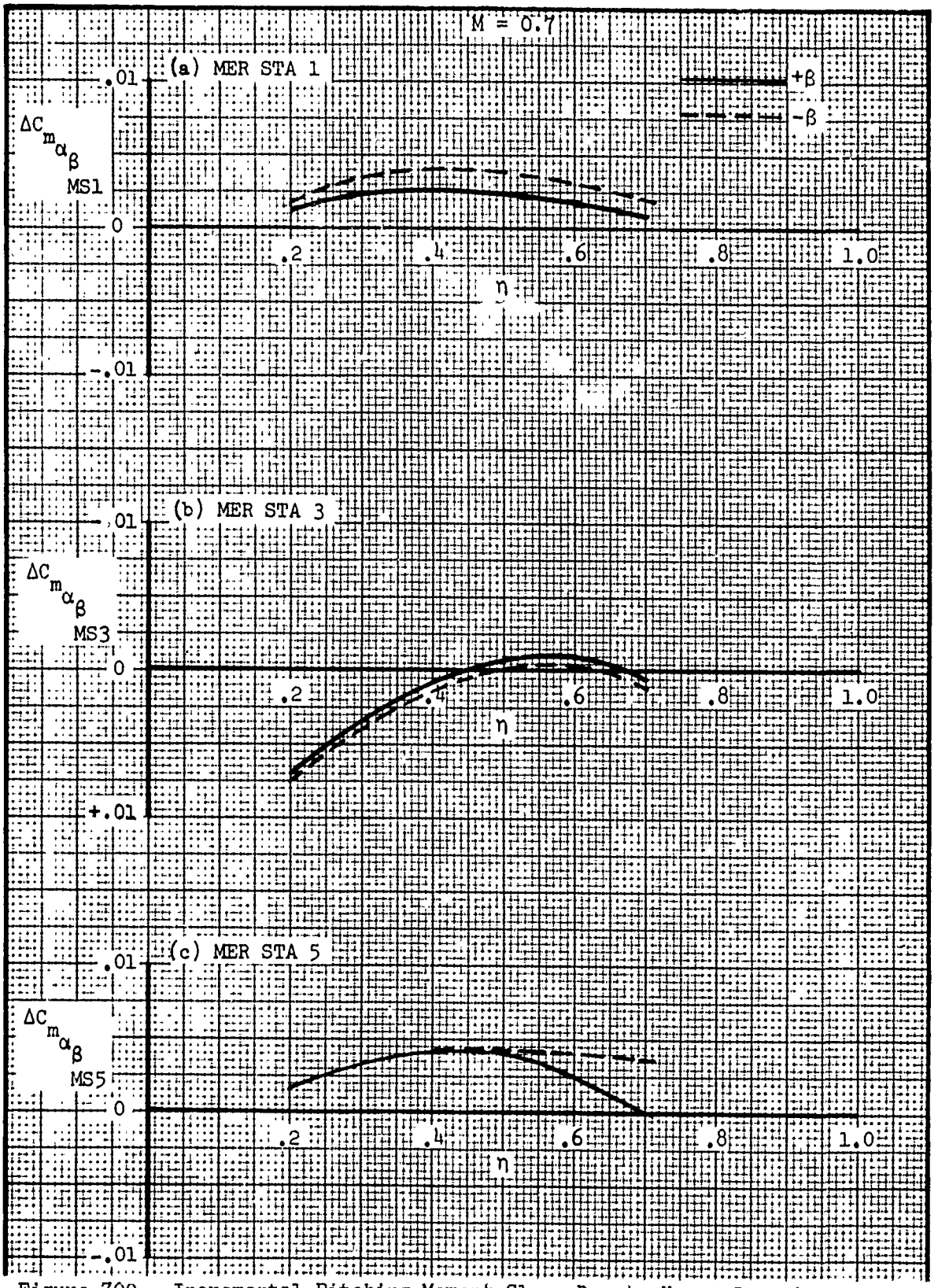


Figure 700. Incremental Pitching Moment Slope Due to Yaw - Spanwise Correction at M=0.7 for MER Stations 1,3 and 5

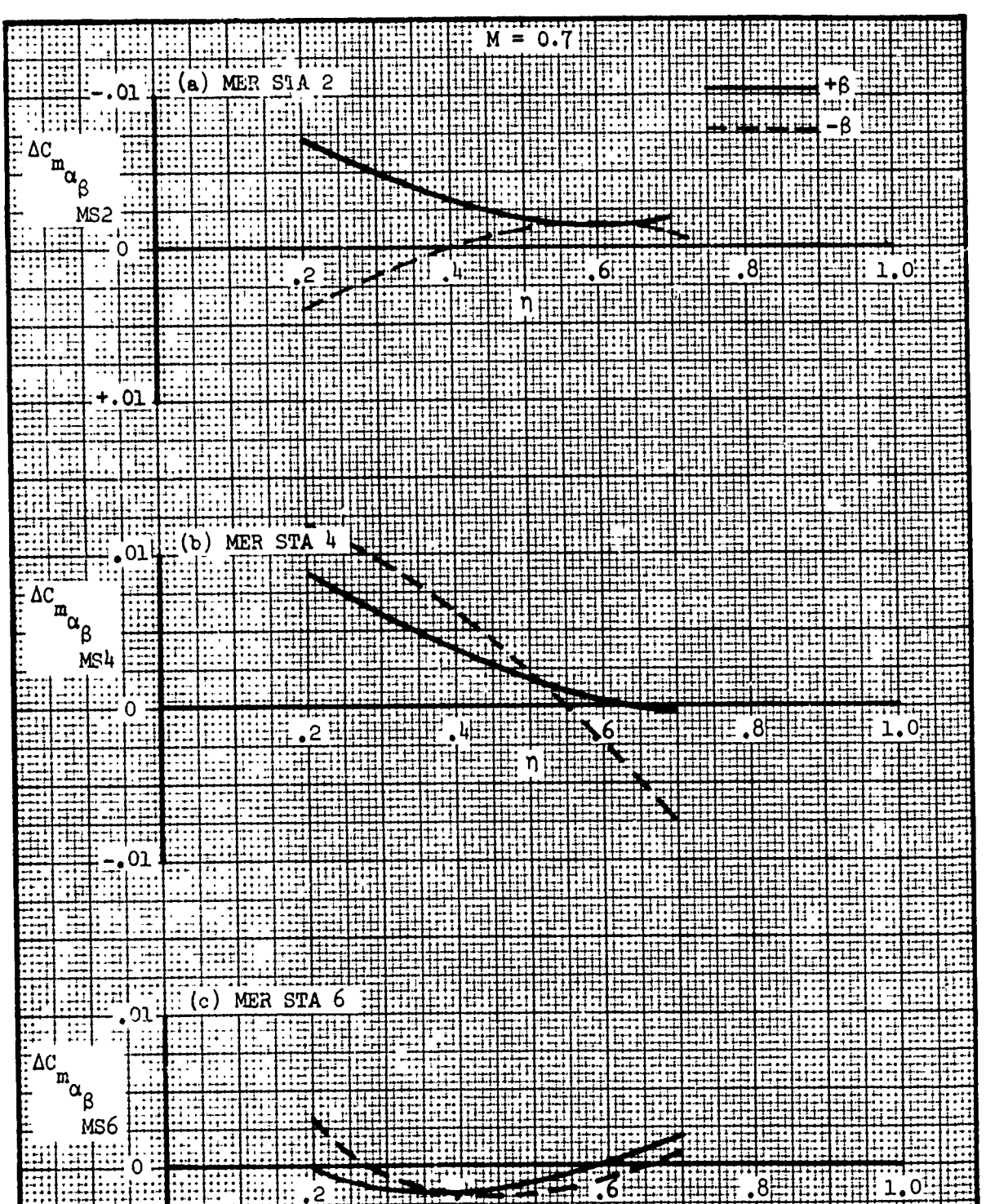


Figure 701. Incremental Pitching Moment Slope Due to Yaw - Spanwise Correction at M=0.7 for MER Stations 2,4 and 6

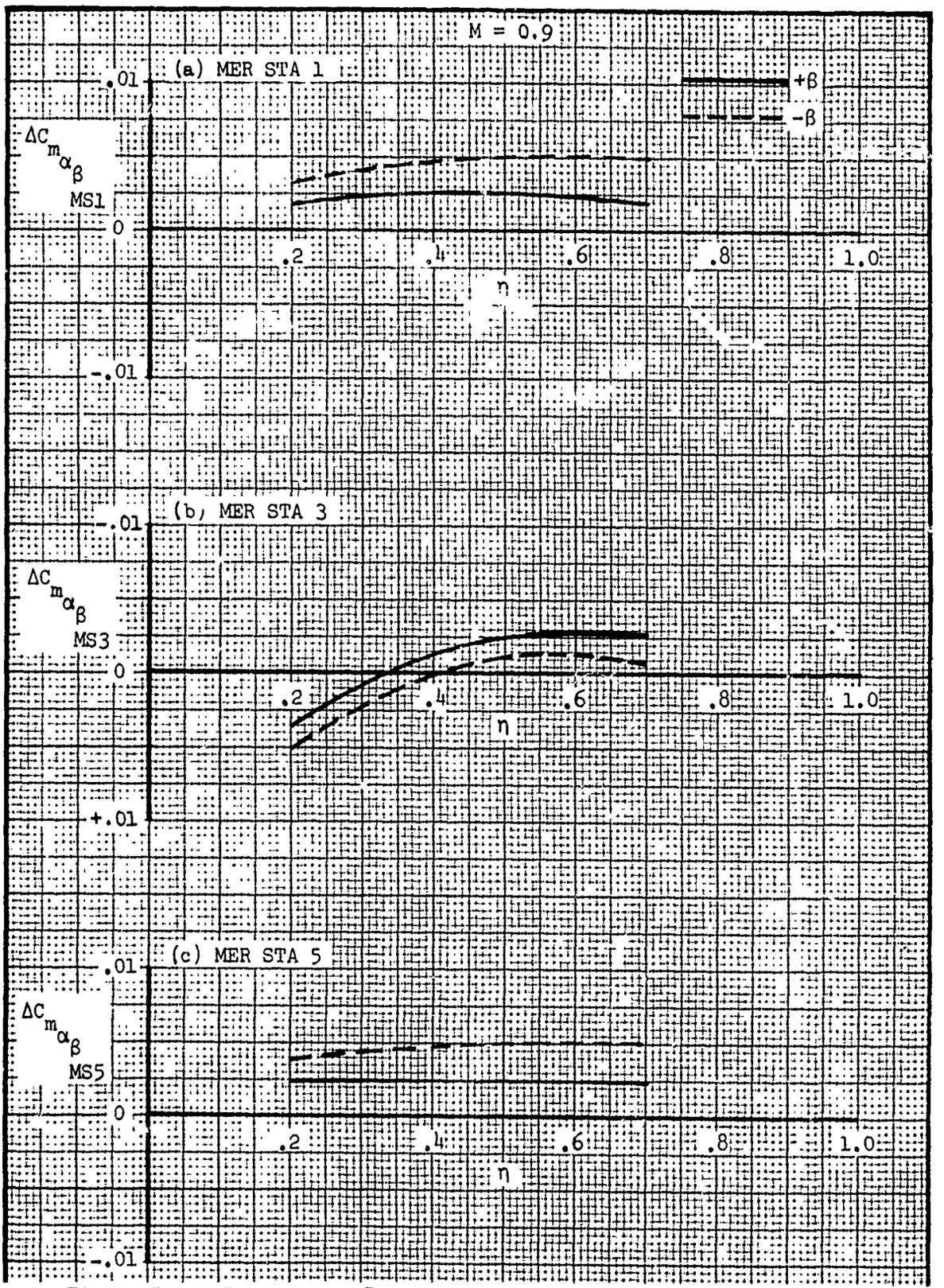


Figure 702. Incremental Pitching Moment Slope Due to Yaw - Spanwise Correction at M=0.9 for MER Stations 1,3, and 5

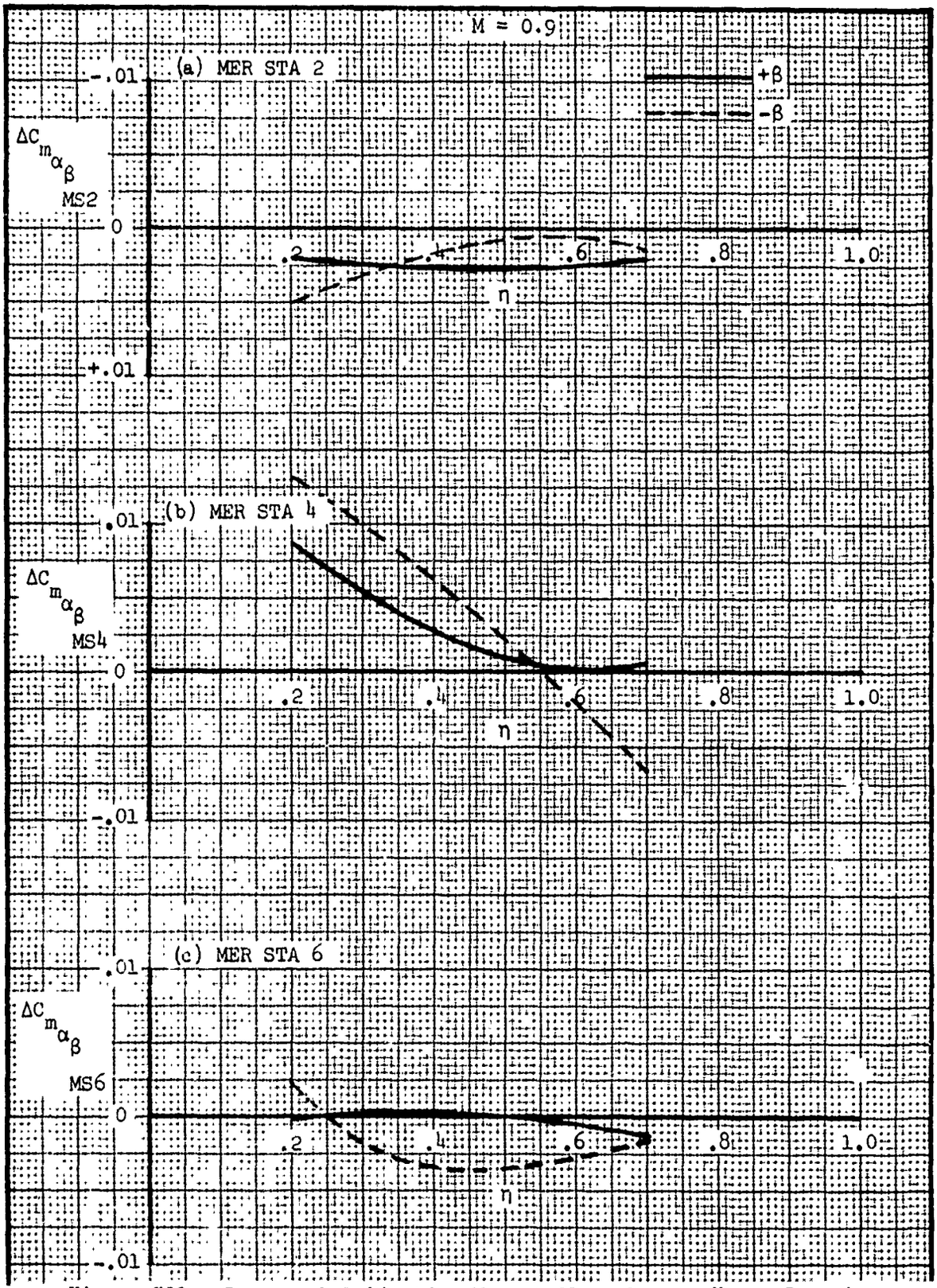


Figure 703. Incremental Pitching Moment Slope Due to Yaw - Spanwise Correction at M=0.9 for MER Stations 2,4, and 6

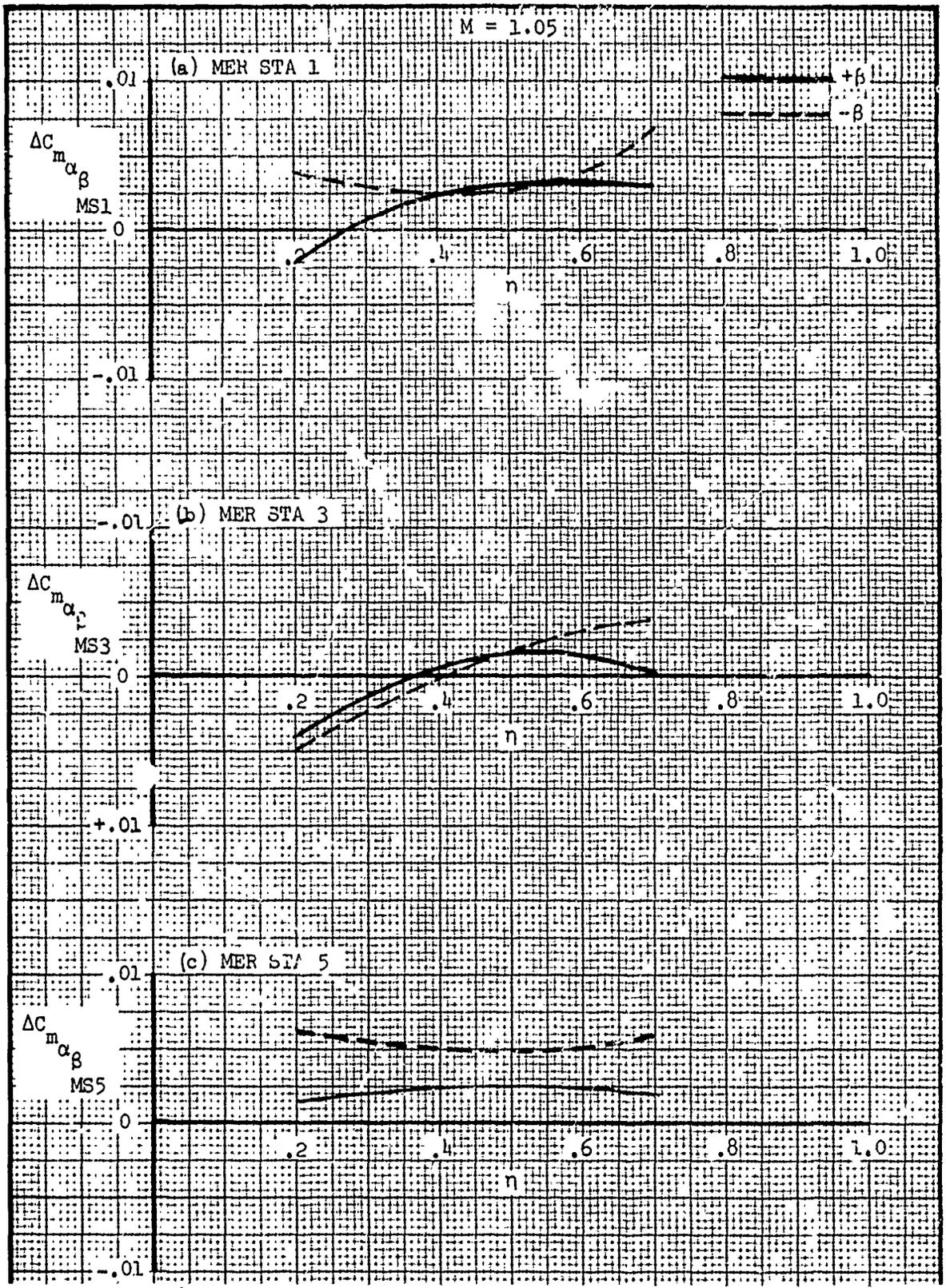


Figure 704. Incremental Pitching Moment Slope Due to Yaw - Spanwise Correction at M=1.05 for MER Stations 1,3 and 5

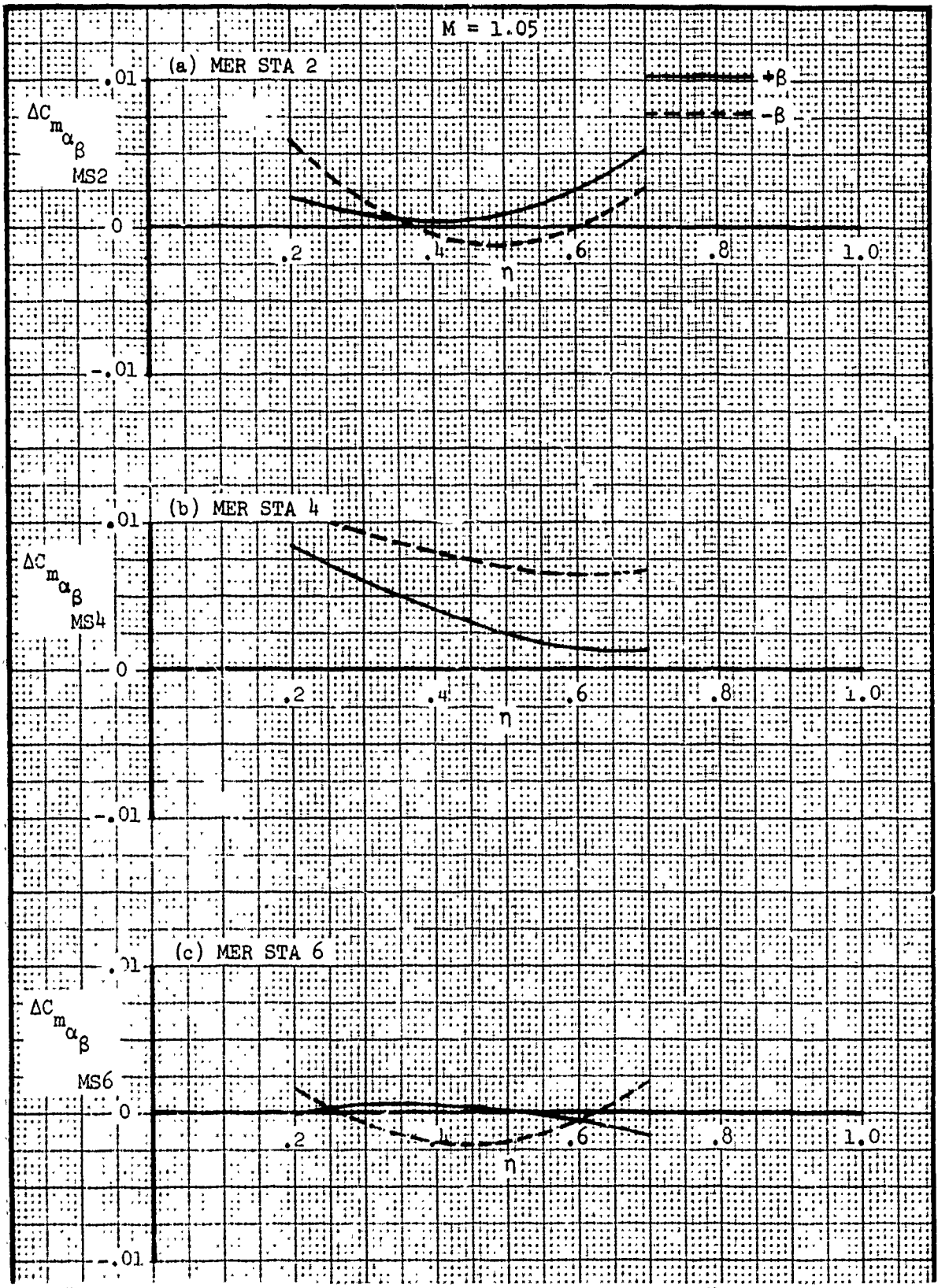


Figure 705. Incremental Pitching Moment Slope Due to Yaw - Spanwise Correction at M=1.05 for MER Stations 2,4, and 6

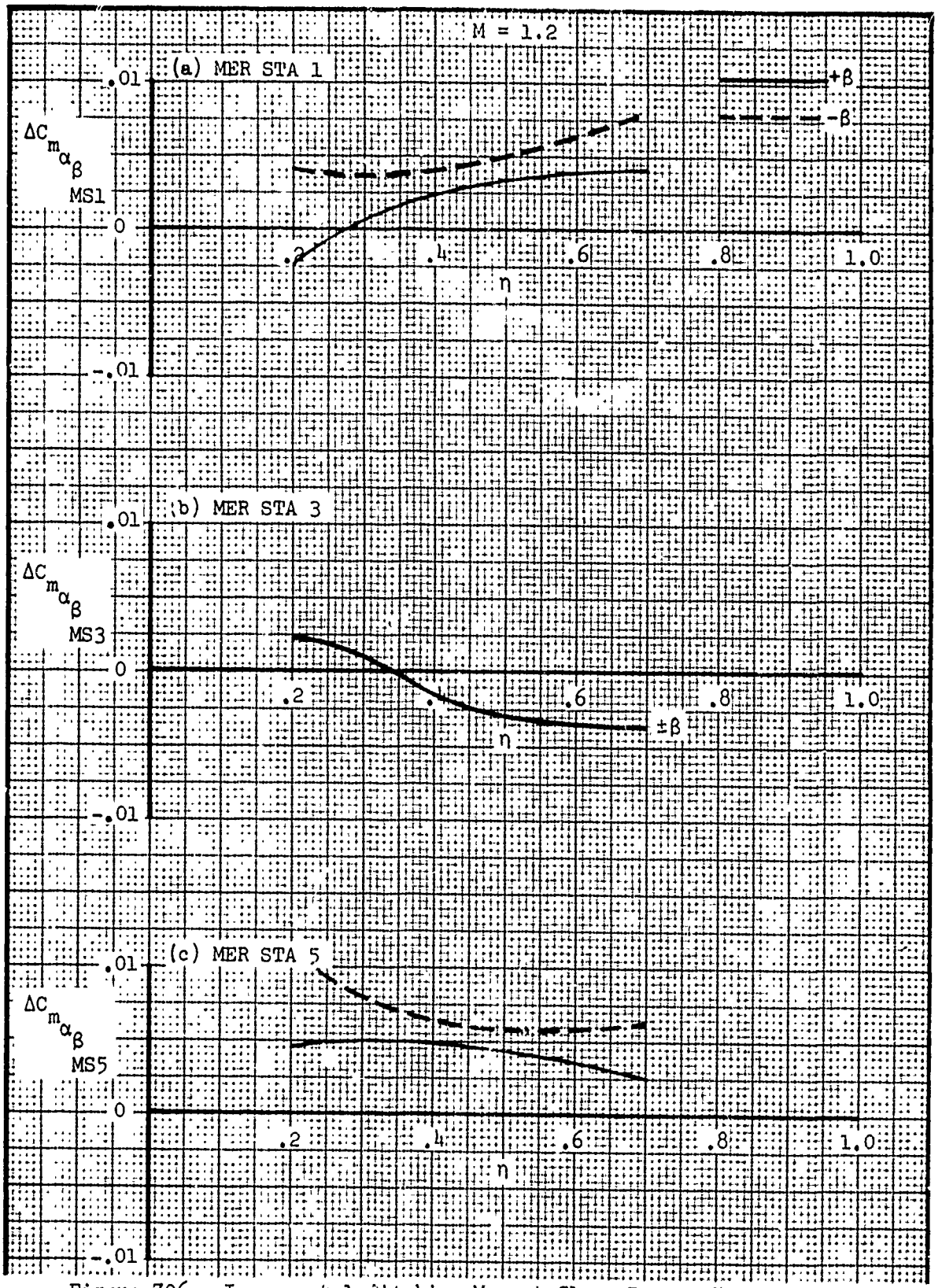


Figure 706. Incremental Pitching Moment Slope Due to Yaw - Spanwise Correction at M=1.2 for MER Stations 1,3, and 5

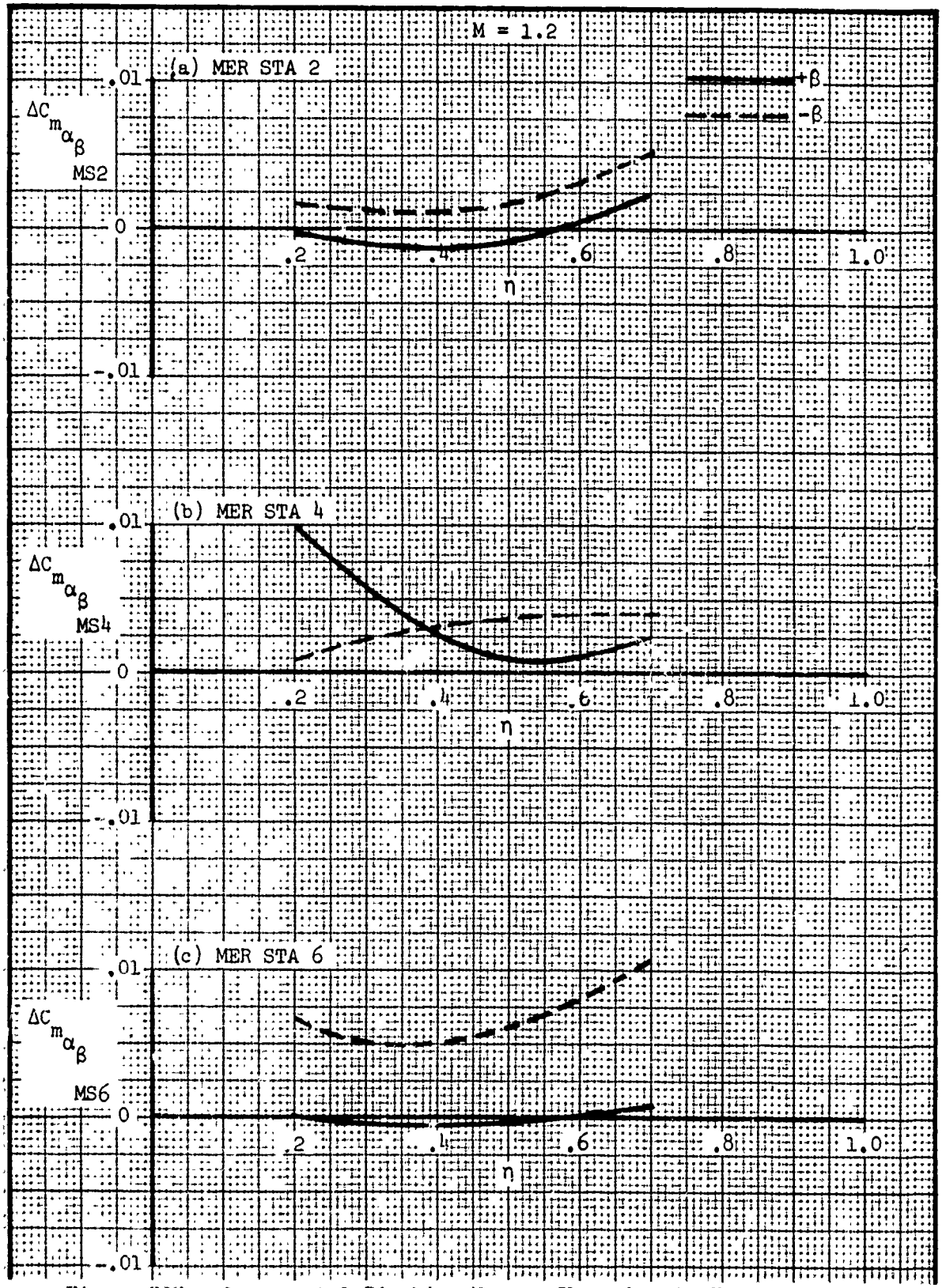


Figure 707. Incremental Pitching Moment Slope Due to Yaw - Spanwise Correction at M=1.2 for MER Stations 2,4, and 6

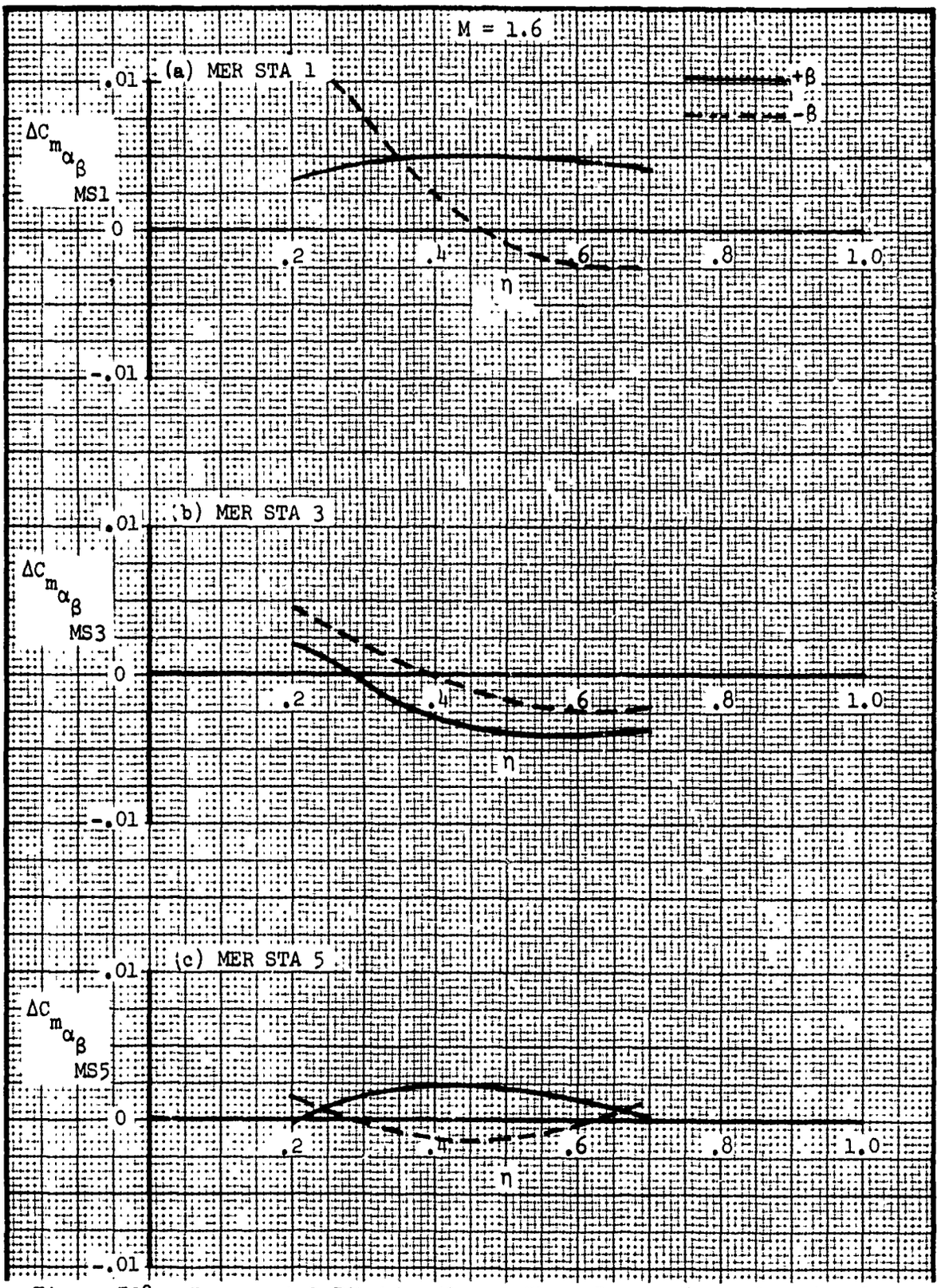


Figure 708. Incremental Pitching Moment Slope Due to Yaw - Spanwise Cor-Correction at M=1.6 for MER Stations 1,3, and 5

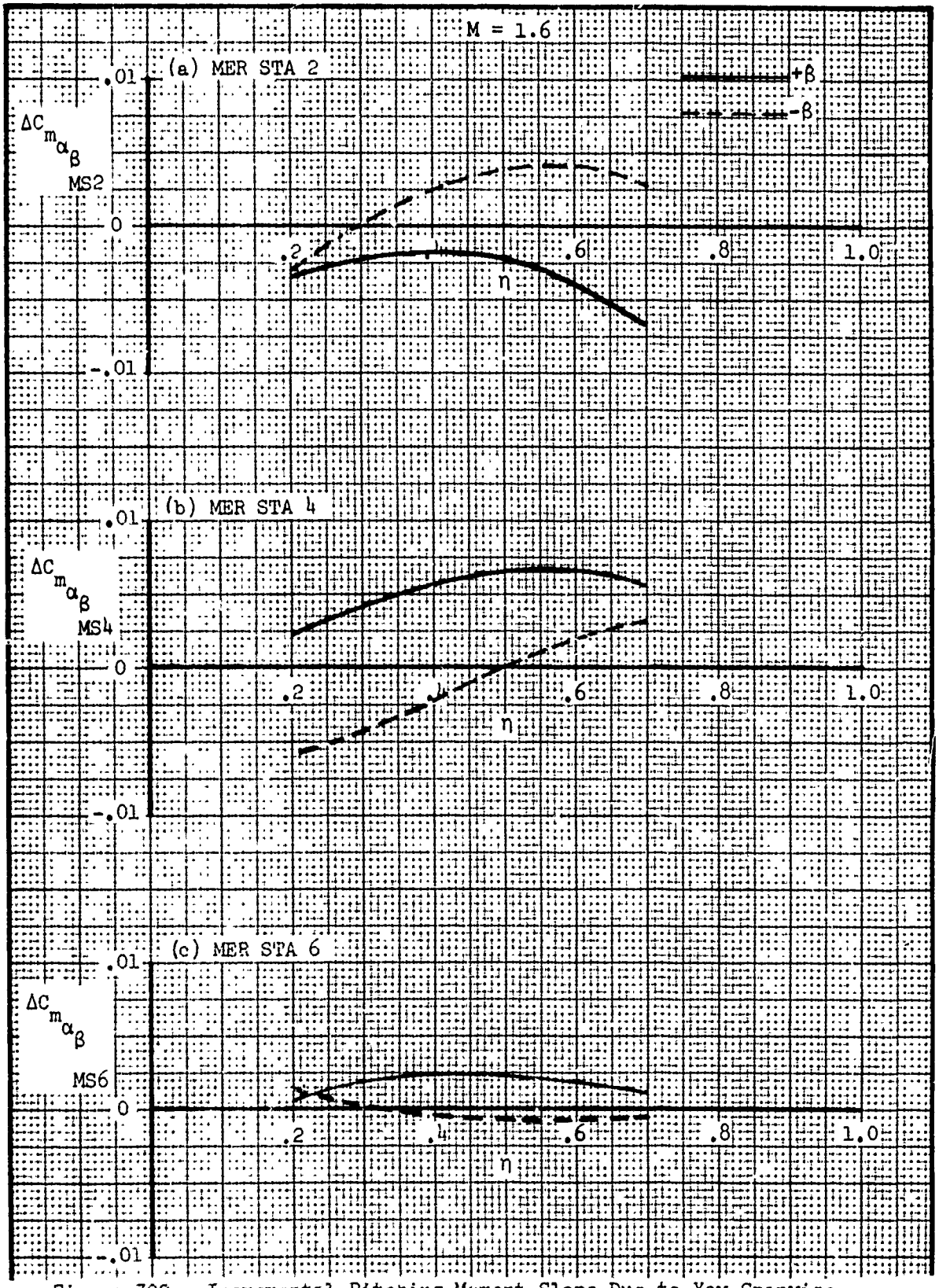


Figure 709. Incremental Pitching Moment Slope Due to Yaw-Spanwise Correction at M=1.6 for MER Stations 2,4 and 6

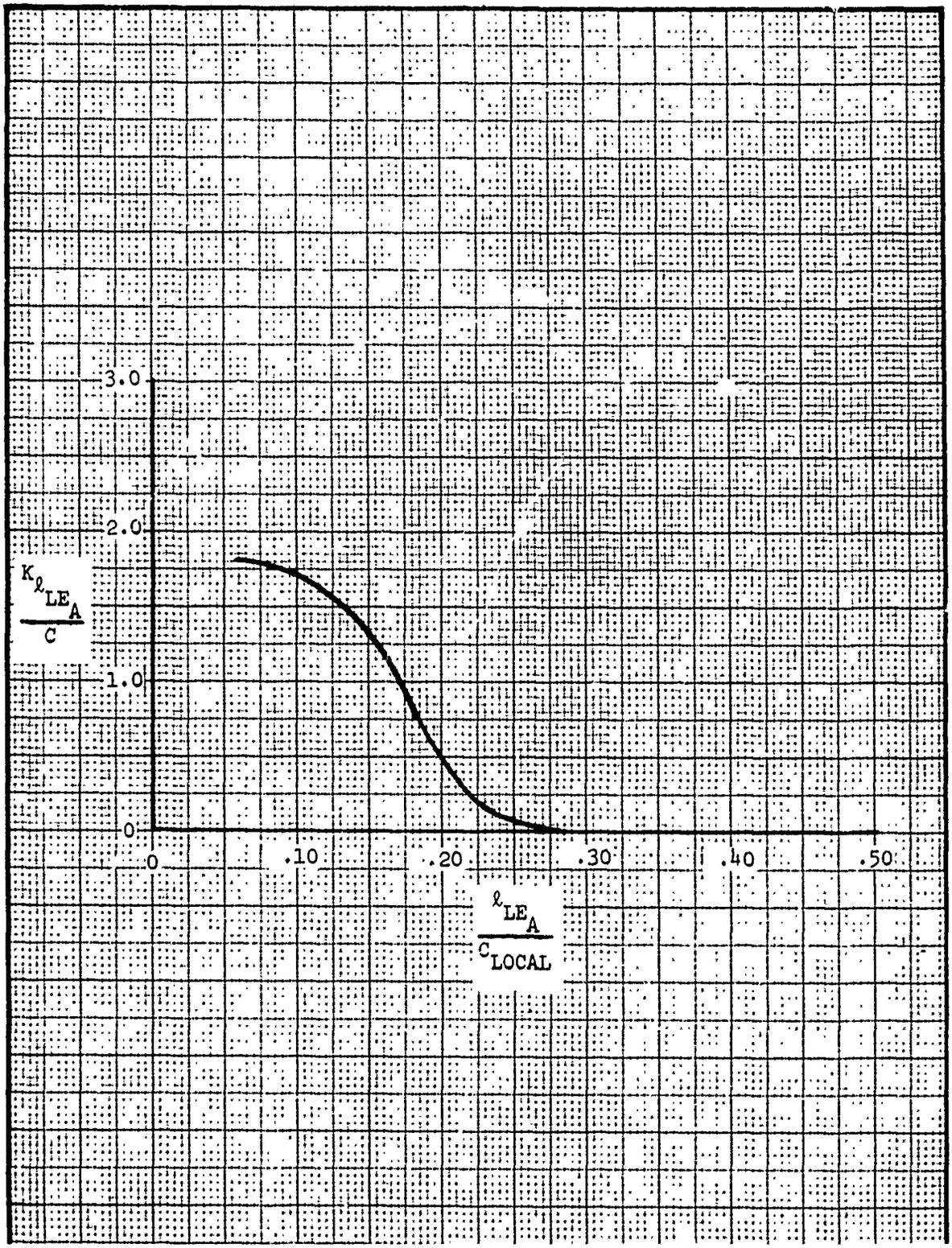


Figure 710. Incremental Pitching Moment Slope Due to Yaw - Chordwise Correction Factor

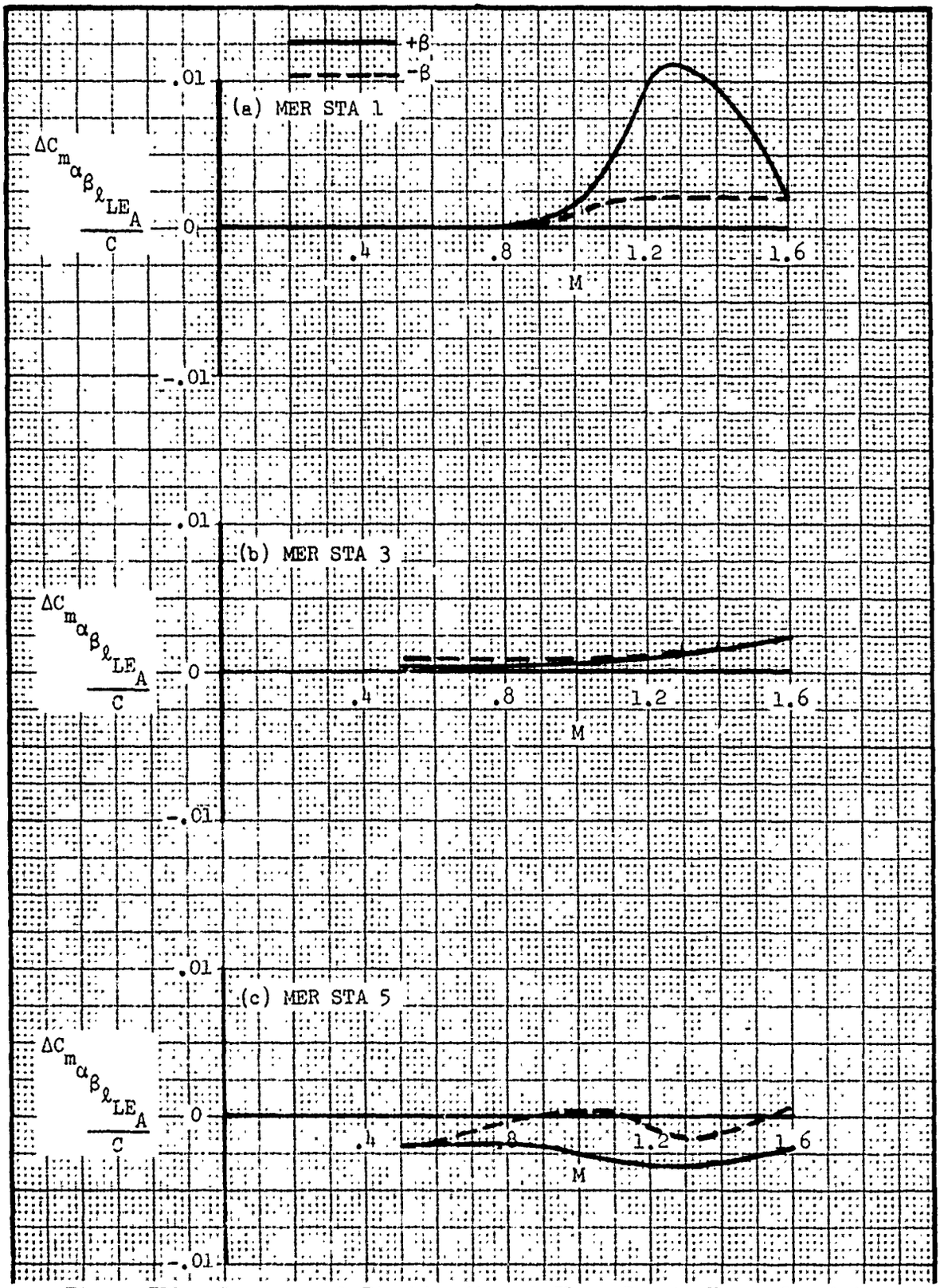


Figure 711. Incremental Pitching Moment Slope Due to Yaw - Chordwise Correction for MER Stations 1,3, and 5

4.4.2.2 Intercept Prediction

The incremental pitching moment intercept prediction is divided into two sections, fuselage centerline-mounted stores and wing-mounted stores. The technique presented in this section covers the Mach number range 0.5 to 1.6.

FUSELAGE CENTERLINE-MOUNTED STORES

MER STATIONS 1-6 (MS1-6):

$$\Delta\left(\frac{PM}{q}\right)_{\alpha=0_{\beta_{\ell}}} = \left(\Delta C_{m_{\alpha=0_{\beta_{\ell}}}}\right)_{MS1-6} K_{SCALE_{PM}}$$

where:

$\Delta C_{m_{\alpha=0_{\beta_{\ell}}}}$ - Incremental $C_{m_{\alpha=0_{\beta}}}$ presented as a function of Mach number, $\frac{1}{deg}$.

MER STA 1 - Figure 712
MER STA 2 - Figure 713
MER STA 3 - Figure 712
MER STA 4 - Figure 713
MER STA 5 - Figure 712
MER STA 6 - Figure 713

$K_{SCALE_{PM}}$ - Defined in Section IV , ft^3.

WING-MOUNTED STORES

MER STATIONS 1,3, and 5 (MS1,3,5):

$$\Delta\left(\frac{PM}{q}\right)_{\alpha=0_{\beta}}{}_{MS1,3,5} = \left(\Delta C_{m_{\alpha=0_{\beta}}}{}_{MS1,3,5} + K_{\ell_{\frac{LE_A}{C}}} \Delta C_{m_{\alpha=0_{\beta_{\ell_{\frac{LE_A}{C}}}}}}\right) K_{SCALE_{PM}}$$

where:

$\Delta C_{m_{\alpha=0_\beta}}$ - Incremental $C_{m_{\alpha=0}}$ per degree β presented as a function of wing spanwise position for Mach numbers 0.7, 0.9, 1.05, 1.2, and 1.6, $\frac{1}{deg}$, Table 20.

$K_{\frac{\ell_{LE_A}}{C}}$ - Proportioning factor based on the distance from the wing leading edge to the nose of the store on MER Station 1 measured in the wing plan view divided by the local wing chord, positive, Figure 710, Subsection 4.4.2.1.

$\Delta C_{m_{\alpha=0_{\beta_{\frac{\ell_{LE_A}}{C}}}}}$ - Incremental $C_{m_{\alpha=0}}$ per degree β based on ℓ_{LE_A}/C defined above and presented as a function of Mach number, $\frac{1}{deg}$.
MER STA 1 - Figure 724
MER STA 3 - Figure 724
MER STA 5 - Figure 724

$K_{SCALE_{PM}}$ - Defined in Section IV, ft^3.

MER STATIONS 2,4, and 6 (MS2,4,6):

$$\Delta\left(\frac{PM}{q}\right)_{\alpha=0_\beta}{}_{MS2,4,6} = \left(\Delta C_{m_{\alpha=0_\beta}}{}_{MS2,1,6}\right) K_{SCALE_{PM}}$$

where:

$\Delta C_{m_{\alpha=0_\beta}}$ - Incremental $C_{m_{\alpha=0}}$ per degree β presented as a function of wing spanwise position for Mach Numbers 0.7, 0.9, 1.05, 1.2, and 1.6, $\frac{1}{deg}$, Table 20.

$K_{SCALE_{PM}}$ - Defined in Section IV, ft^3.

The variation of $\Delta C_{m_{\alpha=0_\beta}}$ for MER Stations 1-6 is presented distinct Mach numbers of 0.7, 0.9, 1.05, 1.2, and 1.6. Table 20 presented below is a guide for locating the curves for $\Delta C_{m_{\alpha=0_\beta}}$ for each MER station at the Mach numbers indicated above. For Mach numbers between 0.5 and 0.7, the value at M = 0.7 should be used in the computation. For Mach numbers between 0.7 and 1.6 other than those distinctly presented, linear interpolation should be used between the appropriate Mach numbers to obtain the required value for computation.

TABLE 20. INCREMENTAL PITCHING MOMENT INTERCEPT COEFFICIENT DUE TO YAW - FIGURE LOCATION GUIDE

$\Delta C_{m_{\alpha=0_\beta}}$	MACH NUMBER				
	0.7	0.9	1.05	1.2	1.6
	Figure Numbers				
MER STA 1	714	716	718	720	722
MER STA 2	715	717	719	721	723
MER STA 3	714	716	718	720	722
MER STA 4	715	717	719	721	723
MER STA 5	714	716	718	720	722
MER STA 6	715	717	719	721	723

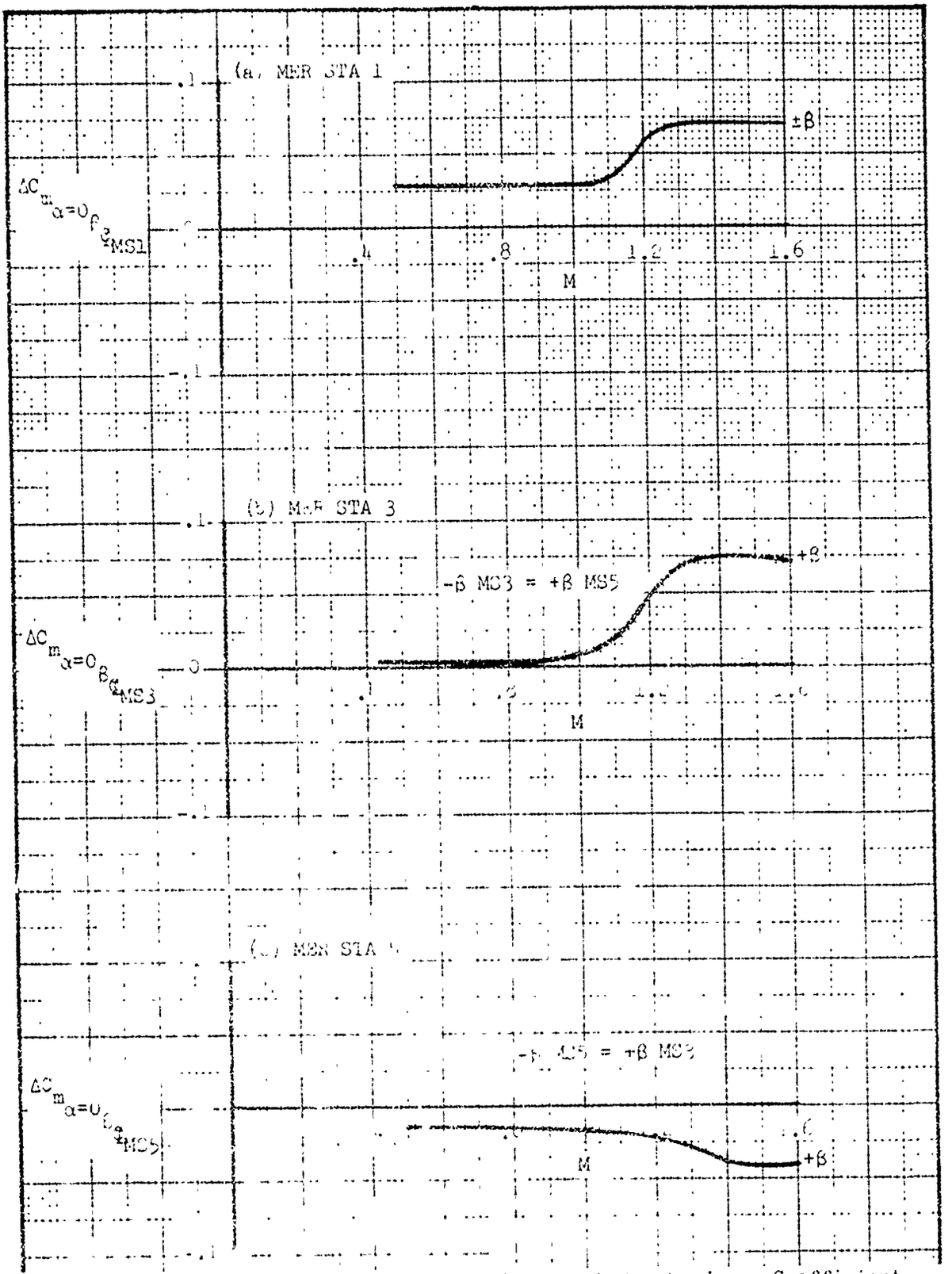


Figure 712. Incremental Rolling Moment Intercept Due to Yaw - Coefficient for Two Mid-Body Sensor Locations, MER Stations 1, 3, and 5

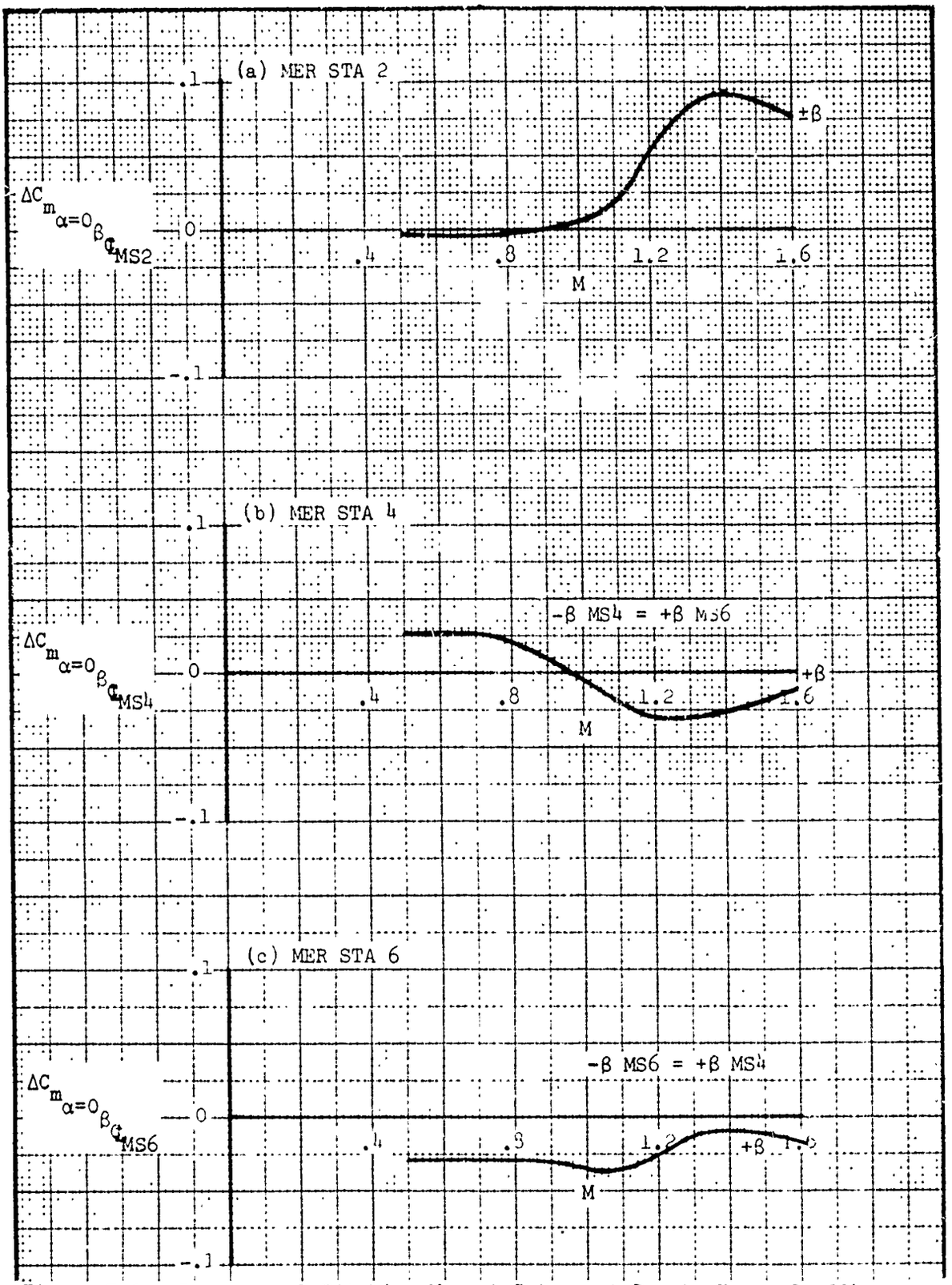
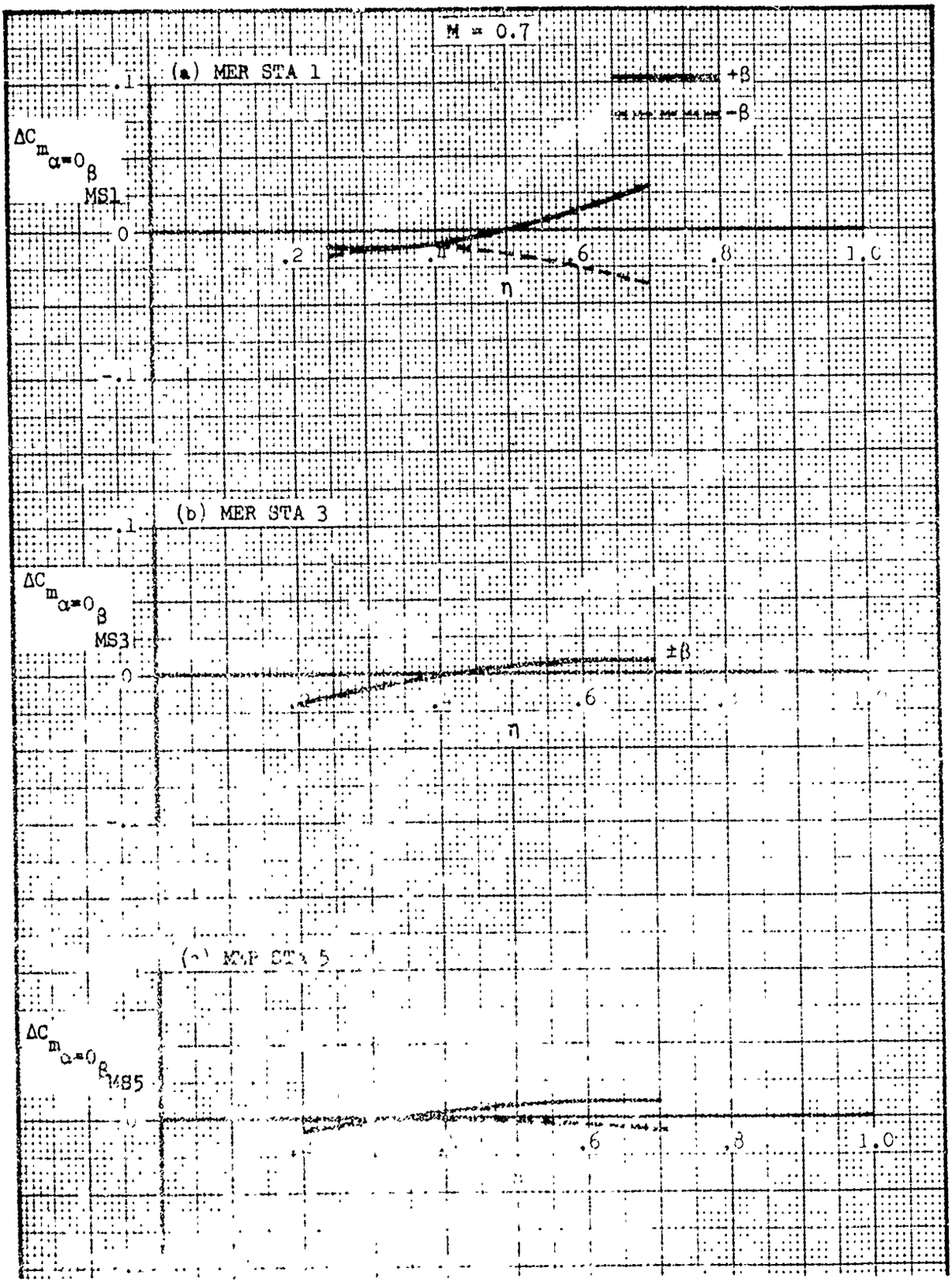


Figure 713. Incremental Pitching Moment Intercept Due to Yaw - Coefficient for Stores Mounted on Fuselage Centerline, MER Stations 2, 4, and 6



Effect of [illegible] on pitching moment due to sideslip for MER stations 1, 3, and 5

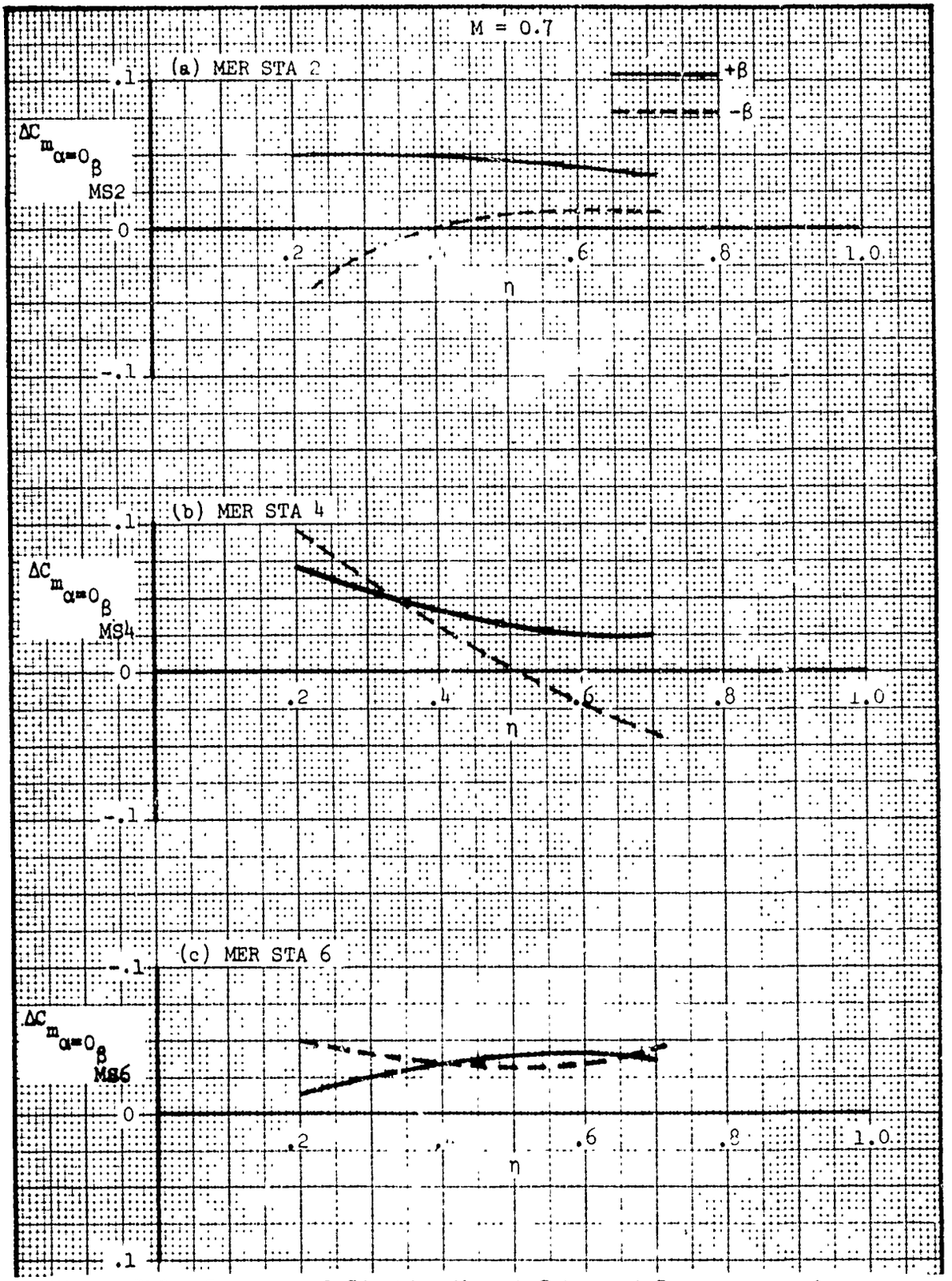


Figure 715. Incremental Pitching Moment Intercept Due to Yaw - Spanwise Correction at M=0.7 for MER Stations 2,4, and 6

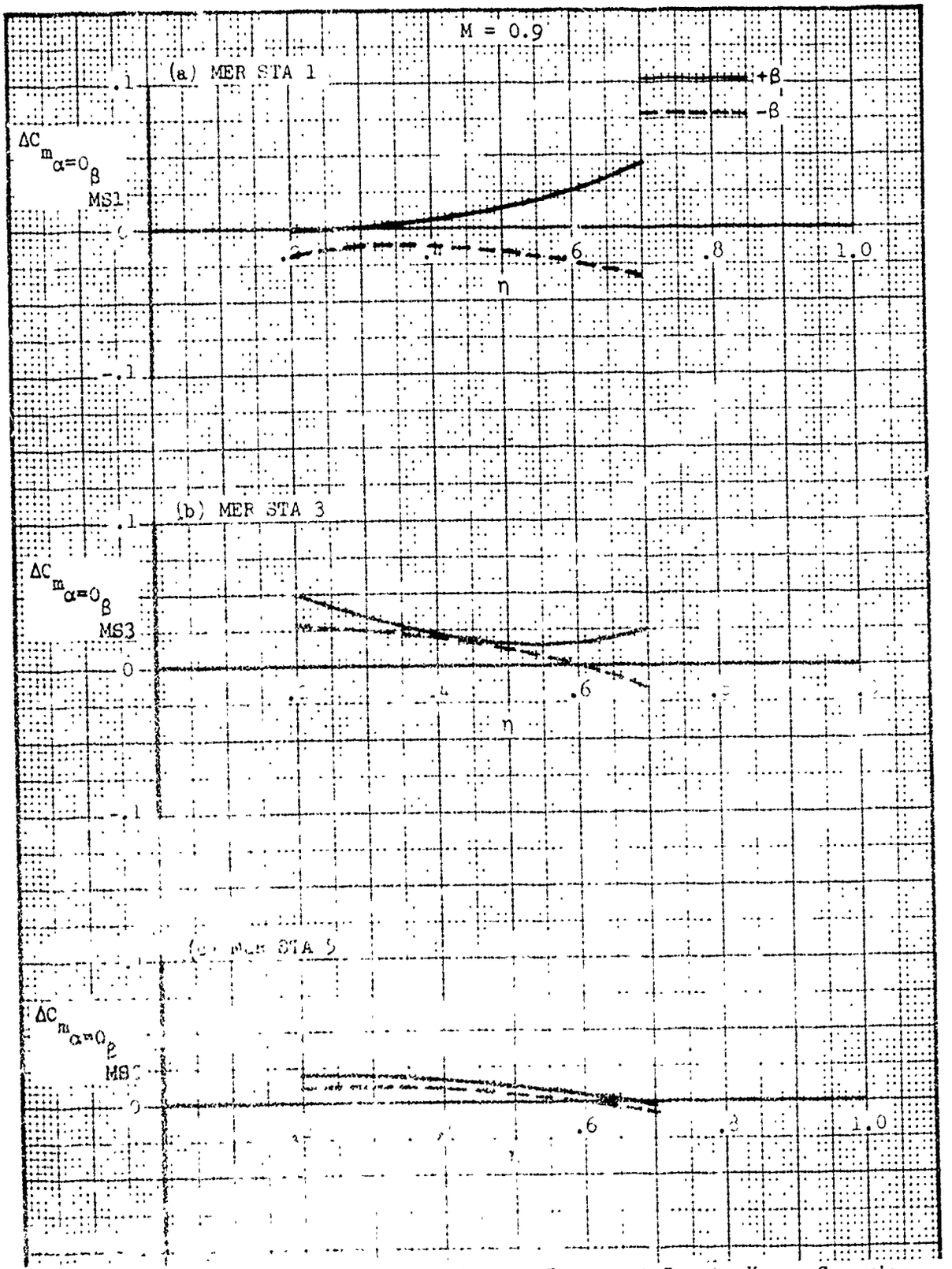


Figure [illegible]. Incremental Pitching Moment Intercept Due to Yaw - Spanwise [illegible] for MER Stations 1, 3, and 5

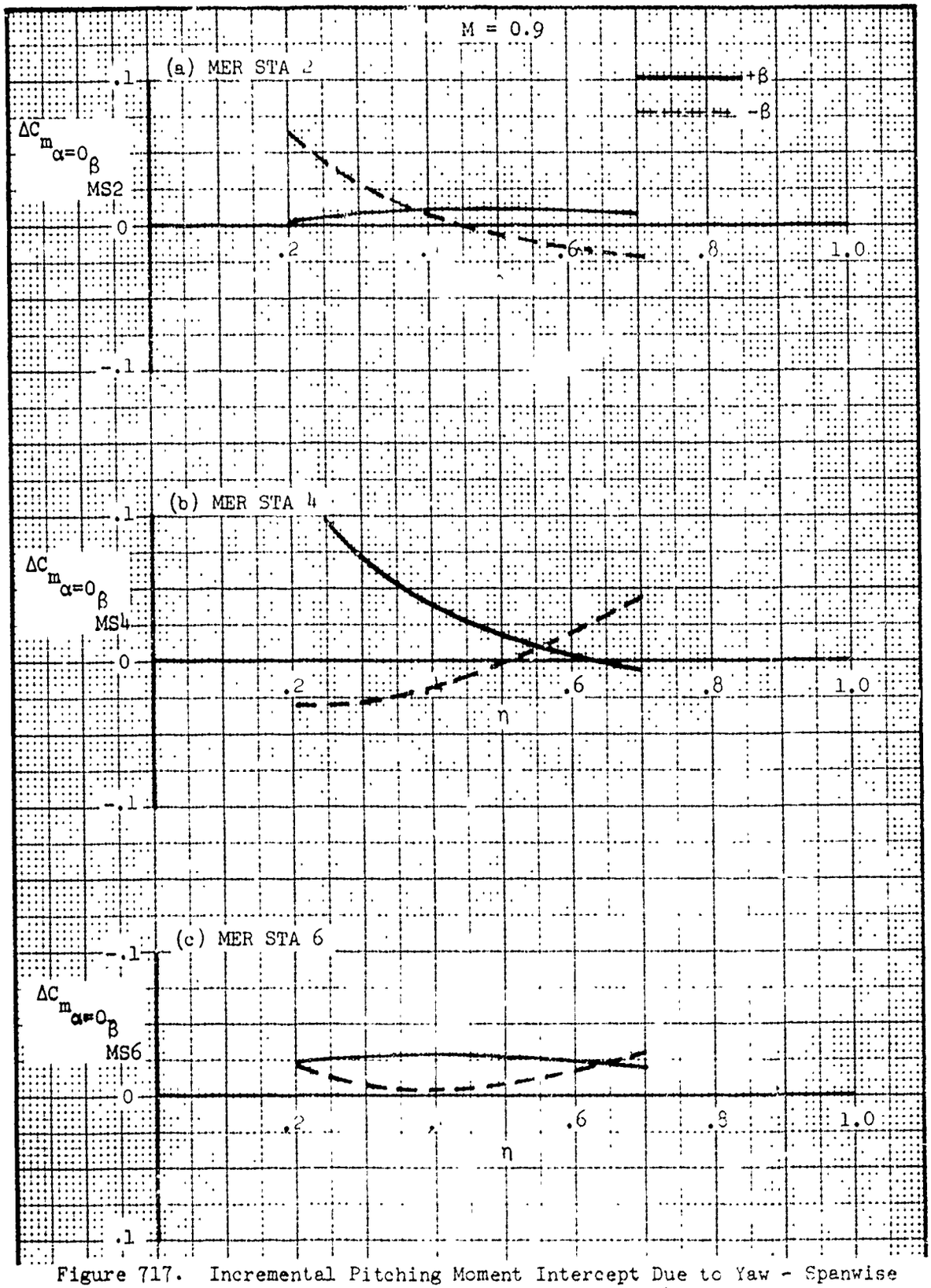
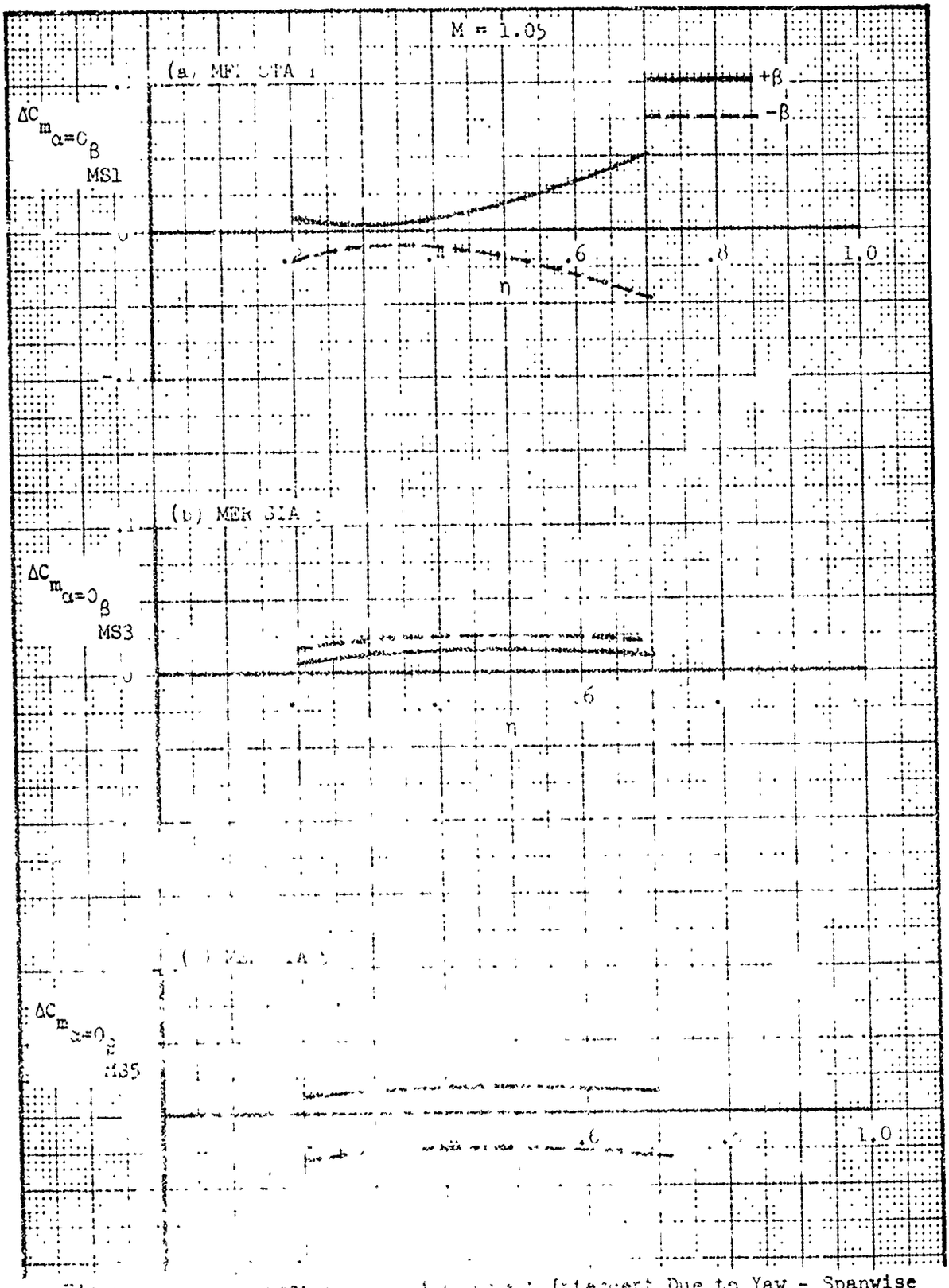


Figure 717. Incremental Pitching Moment Intercept Due to Yaw - Spanwise Correction at M=0.9 for MER Stations 2,4, and 6



Intercept Due to Yaw - Spanwise
Stations 1, 3, and 5

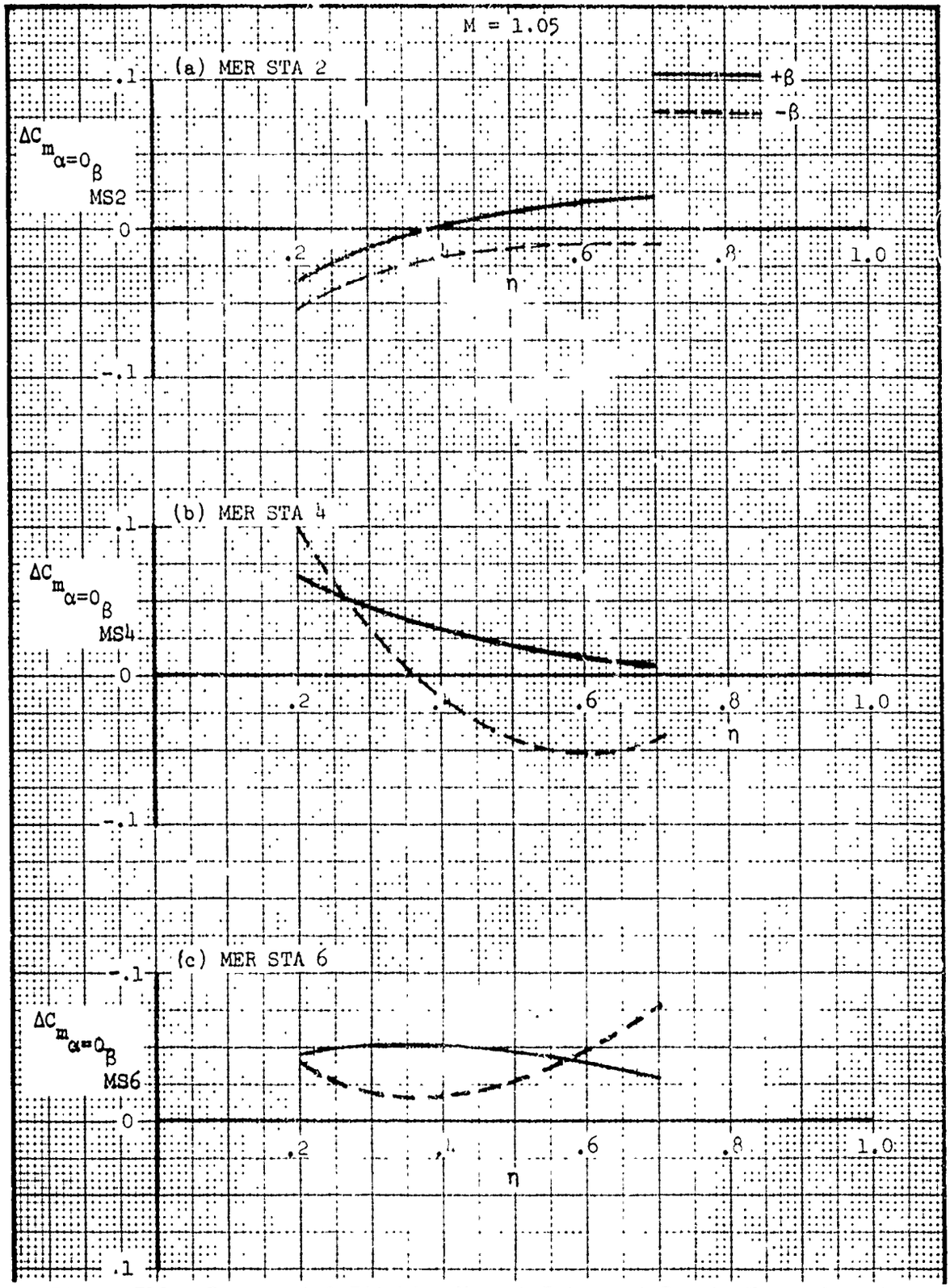


Figure 719. Incremental Pitching Moment Intercept Due to Yaw - Spanwise Correction at M=1.05 for MER Stations 2,4, and 6

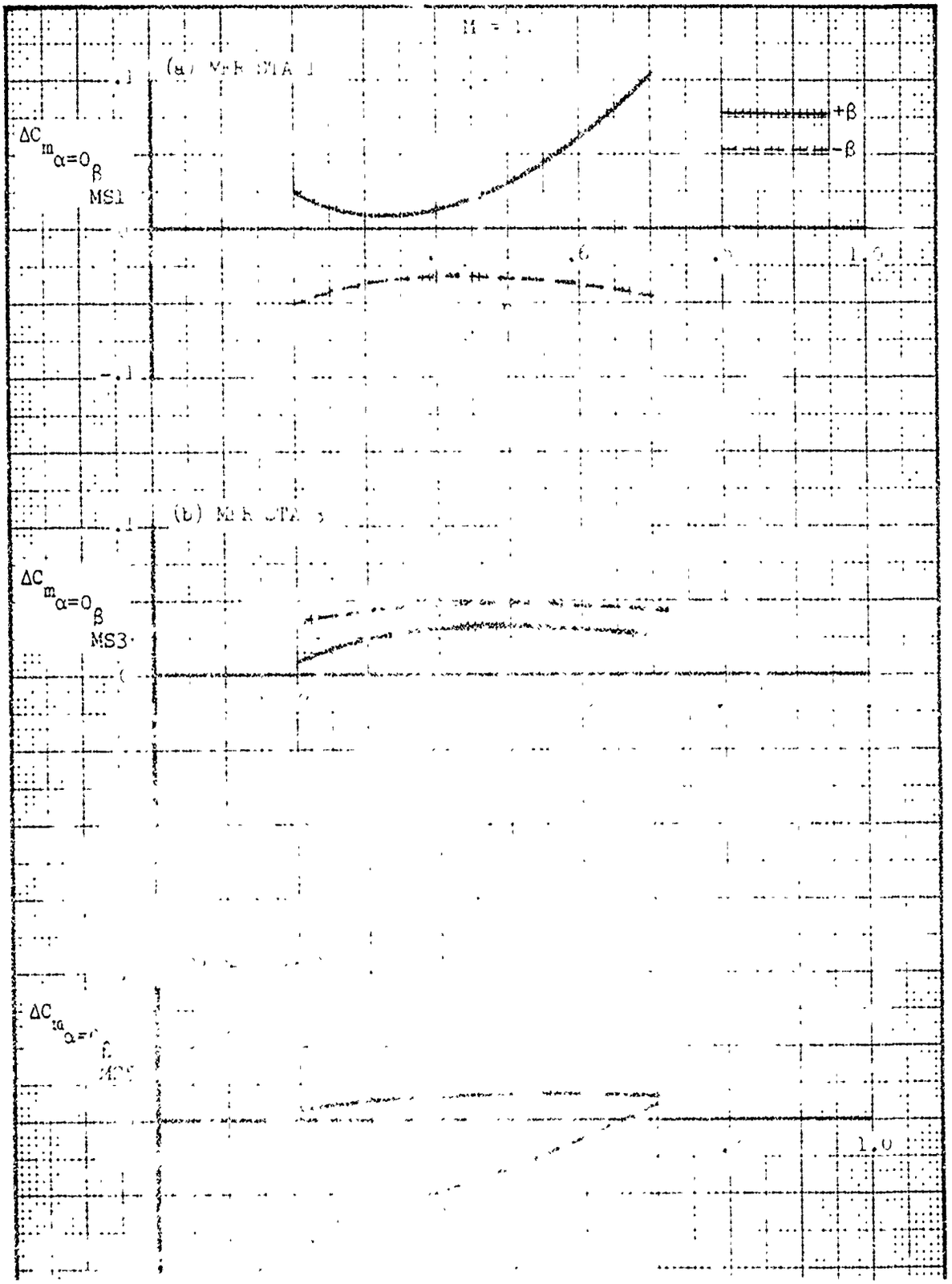


Figure 7 ... Step Due to Yaw - Spanwise ...

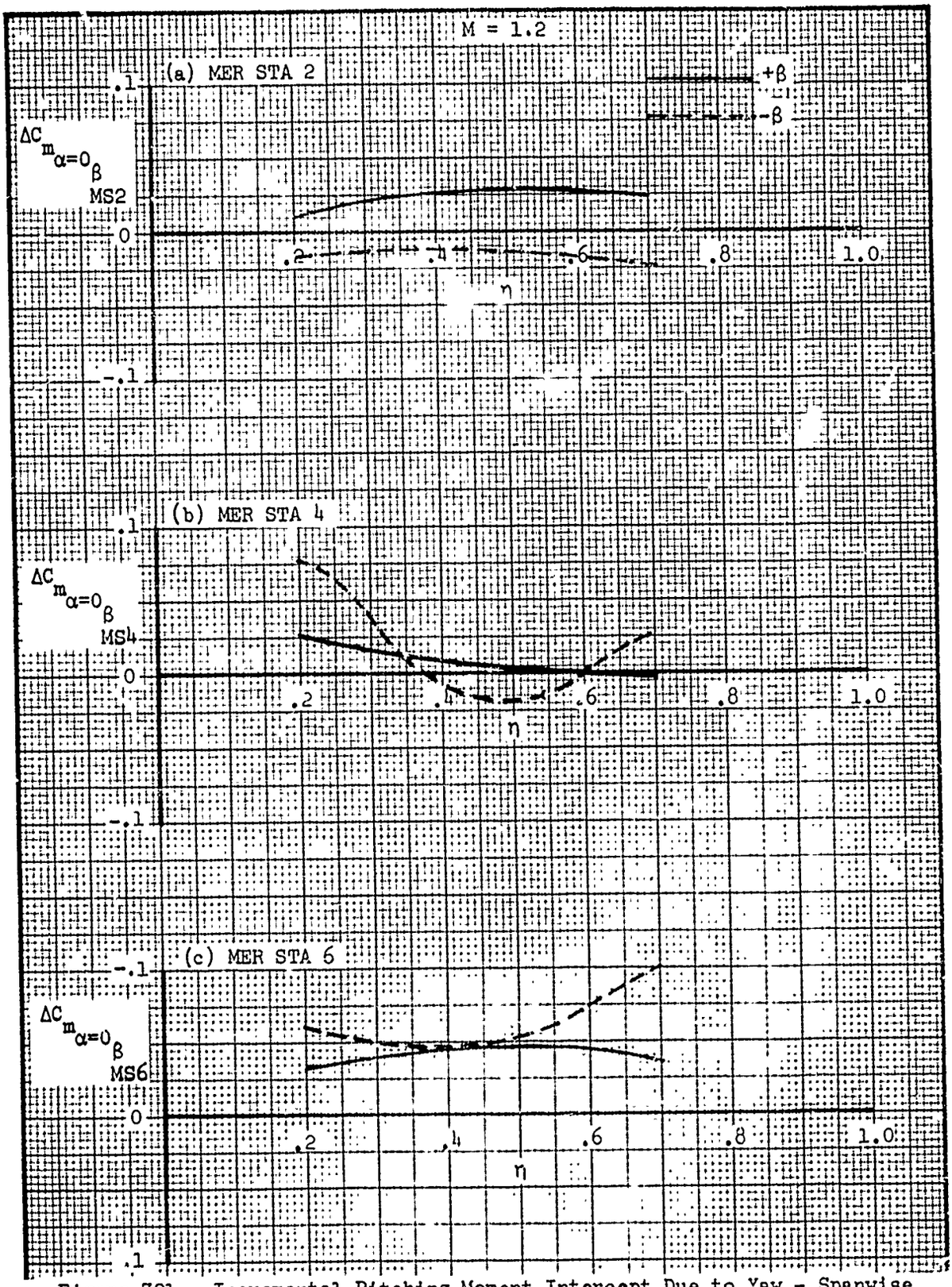


Figure 721. Incremental Pitching Moment Intercept Due to Yaw - Spanwise Correction at M=1.2 for MER Stations 2,4, and 6

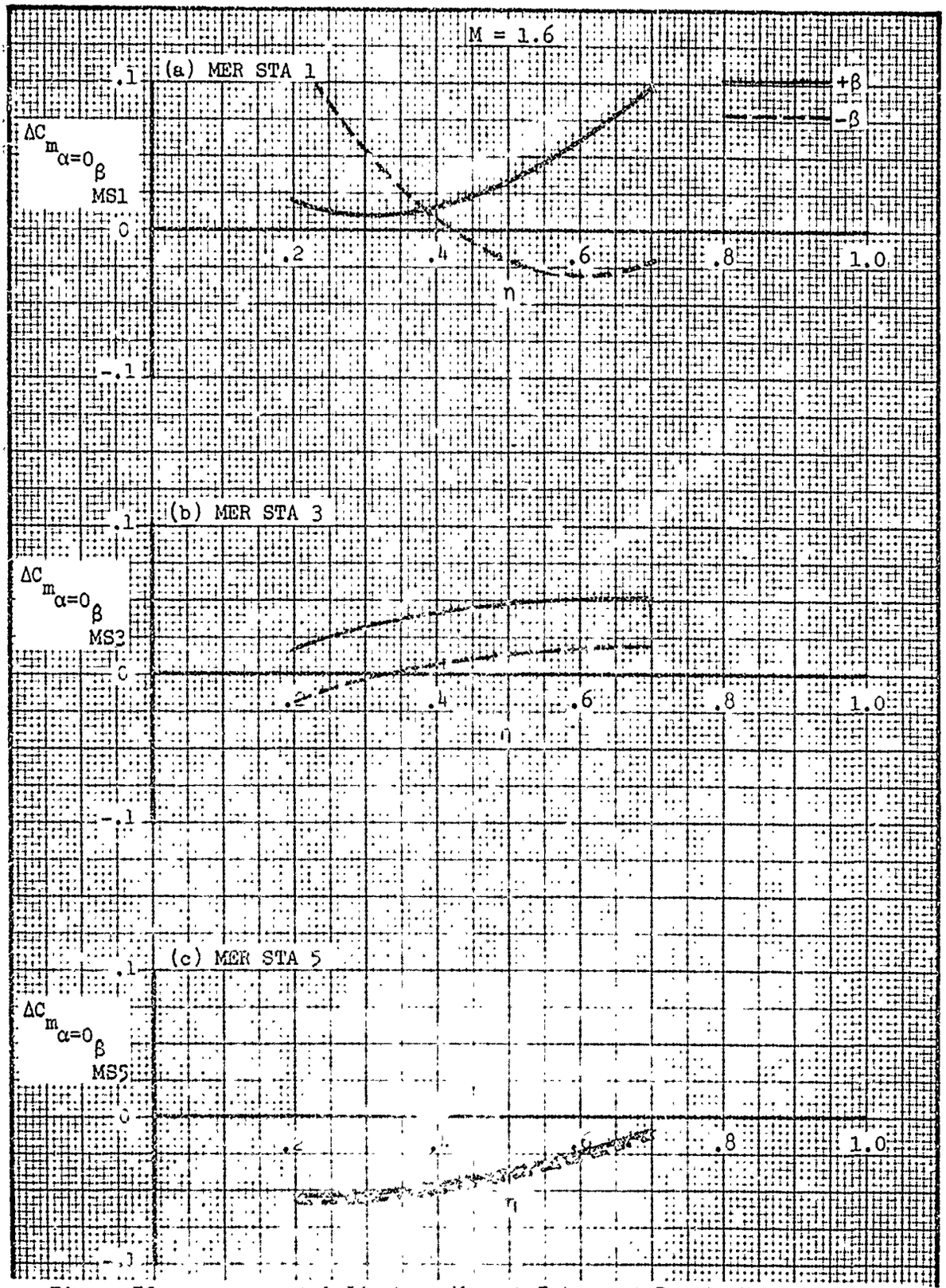


Figure 722. Incremental Pitching Moment Intercept Due to Yaw - Spanwise Correction at Mach 1.6 for MER Stations 1,3, and 5

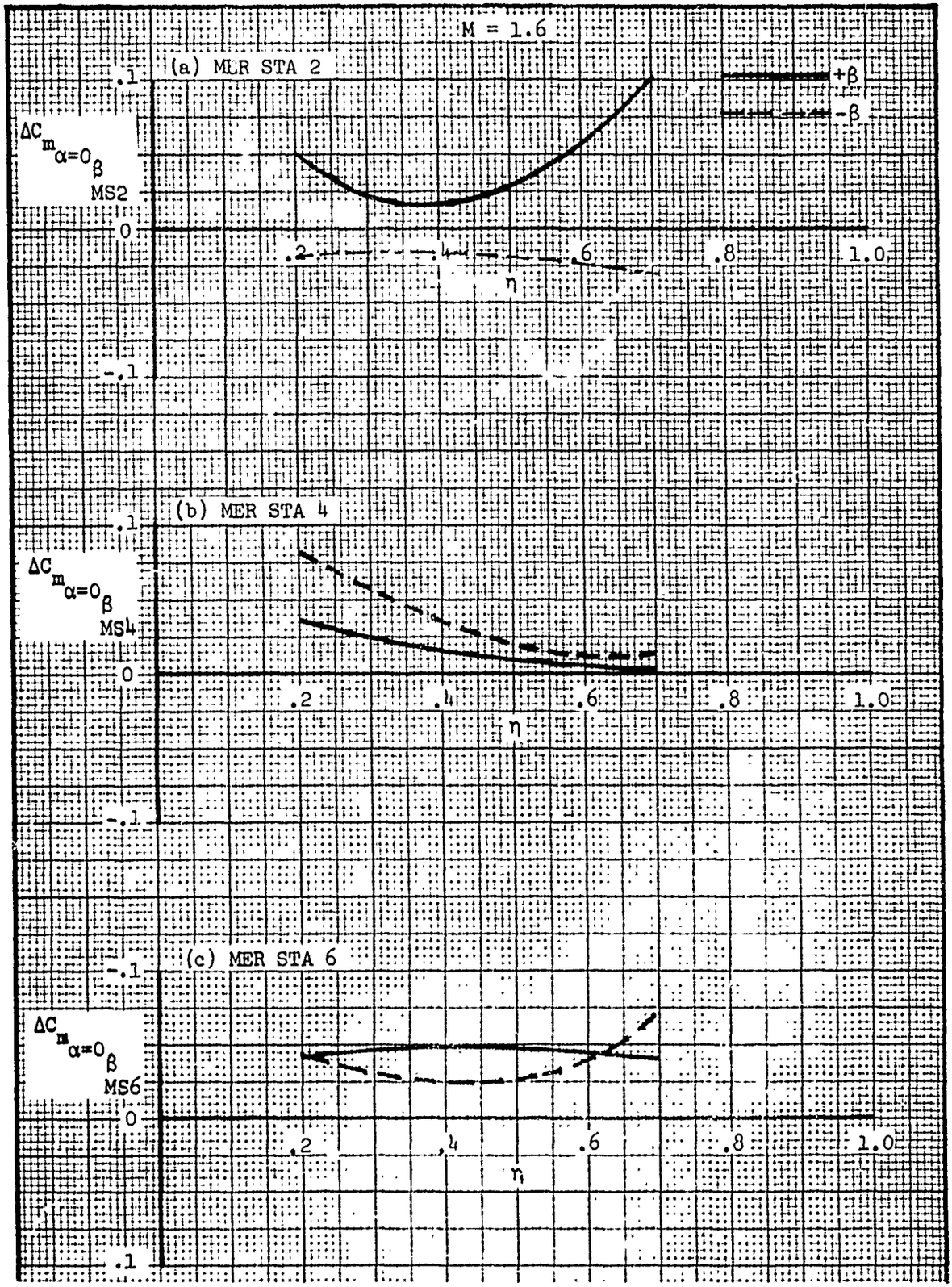


Figure 723. Incremental Pitching Moment Intercept Due to Yaw - Spanwise Correction at M=1.6 for MER Stations 2,4, and 6

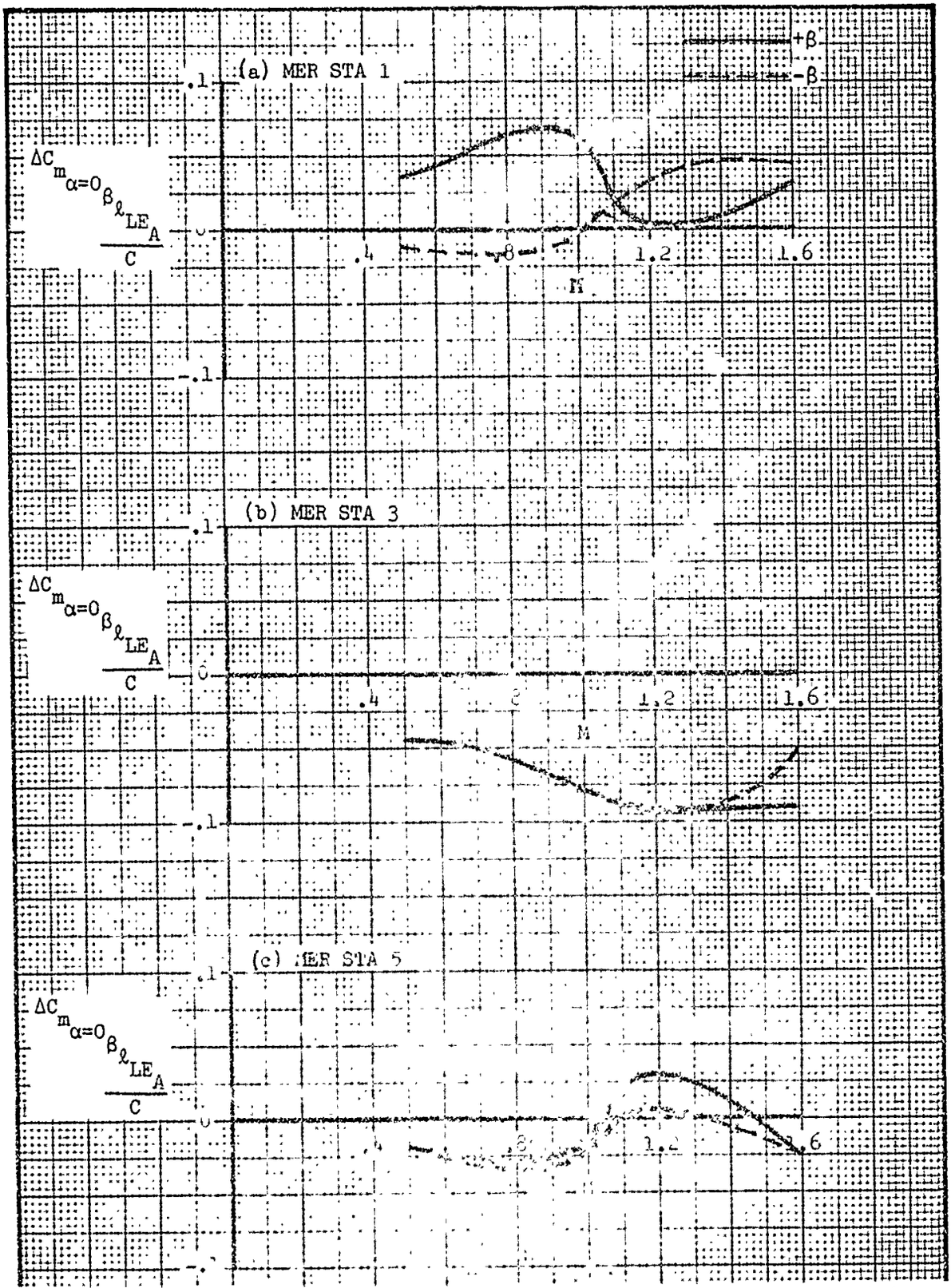


Figure 72a. Incremental Pitching Moment Intercept Due to Yaw - Chordwise Correction for MER Stations 1, 3 and 5

4.4.3 Increment-Adjacent Store Interference

Methods to predict the increment in captive store pitching moment variation with angle of attack, $\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha \\ INTF}}$, and the value at $\alpha=0$, $\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ INTF}}$, for multiple carried stores are presented within this section. The basic prediction is made as a function of minimum store to store separation distance, y_{INTF} (see Subsection 3.1.3), at discrete Mach numbers. The data are presented separately for the aft cluster of stores on MER Stations 1, 3 and 5 and the forward cluster, MER Stations 2,4 and 6. Predictions are also separately made for inboard → outboard interference, the interfering store carried inboard of the subject captive store, and outboard → inboard interference, the interfering store carried outboard of the subject captive store. On the curves defining the basic prediction ADJ. SHOULDER refers to the MER shoulder store adjacent to the interfering store, OPPOSITE SHOULDER is the MER shoulder store furthest displaced laterally from the interfering store, and ℄ Store is the MER centerline store, MER Station 1 or 2.

4.4.3.1 Slope Prediction

The equations governing the prediction of incremental pitching moment variation with angle of attack are presented below.

INTERFERING STORES CARRIED INBOARD

MER STATIONS 1,2,3,4,5 and 6 (MS1-6):

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha \\ INTF \\ MS1-6}} = \left(\sum \Delta C_{m_{\substack{\alpha \\ INTF \\ IB\rightarrow OB \\ MS1-6}}}\right) K_{SCALE_{PM}}$$

where:

$\Delta C_{m_{\alpha_{\substack{INTF \\ IB \rightarrow OB}}}}$ - Incremental pitching moment slope coefficient due to inboard to outboard interference as a function of y_{INTF}, $\frac{1}{deg}$, see Table 21.

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

INTERFERING STORES CARRIED OUTBOARD

MER STATIONS 1,2,3,4,5 and 6 (MS1-6):

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha \\ INTF \\ MS1-6}} = \left(\sum \Delta C_{m_{\substack{\alpha \\ INTF \\ OB \rightarrow IB \\ MS1-6}}} + \sum \Delta^2 C_{m_{\substack{\alpha \\ INTF \\ MS1,3,5}}}\right) K_{SCALE_{PM}}$$

where:

$\Delta C_{m_{\substack{\alpha \\ INTF \\ OB \rightarrow IB}}}$ - Incremental pitching moment slope coefficient due to outboard to inboard interference as a function of y_{INTF}, $\frac{1}{deg}$, see Table 21.

$\Delta^2 C_{m_{\substack{\alpha \\ INTF}}}$ - Increment to $\Delta C_{m_{\substack{\alpha \\ INTF \\ OB \rightarrow IB}}}$ for the aft cluster as a function of store nose separation, $\sqrt{x^2_{INTF} + y^2_{INTF}}$ (see Subsection 3.1.3) assumed to be negative when the interfering store is aft of the subject captive store, $\frac{1}{deg.}$, Figure [illegible]

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

INTERFERING STORES CARRIED INBOARD AND OUTBOARD

MER STATIONS 1,2,3,4,5 and 6 (MS1-6)

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha \\ INTF \\ MS1-6}} = \left[K_{INTC_2} + K_{SLOPE_2}\left(\sum \Delta C_{m_{\substack{\alpha \\ INTF \\ IB\rightarrow OB \\ MS1-6}}} + \sum \Delta C_{m_{\substack{\alpha \\ INTF \\ OB\rightarrow IB \\ MS1-6}}} + \sum \Delta^2 C_{m_{\substack{\alpha \\ INTF \\ MS1,3,5}}}\right)\right] K_{SCALE_{PM}}$$

where:

K_{INTC_2} - Intercept for the inboard-outboard interference combination correction for pitching moment slope, $\frac{1}{deg}$, Figure 742.

K_{SLOPE_2} - Slope for the inboard-outboard combination correction for pitching moment slope, Figure 741.

$\Delta C_{m_{\substack{\alpha \\ INTF \\ IB\rightarrow OB}}}$ - Previously defined.

$\Delta C_{m_{\substack{\alpha \\ INTF \\ OB\rightarrow IB}}}$ - Previously defined.

$\Delta^2 C_{m_{\substack{\alpha \\ INTF}}}$ - Previously defined.

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

The above equations define the interference increment calculations at a given Mach number. For Mach numbers other than those presented, M = 0.7, 0.9, 1.05, 1.2, 1.6, these guidelines should be followed. If the subject Mach number is less than M = 0.7, use the value at M = 0.7. For other Mach numbers linear interpolation should be used between the Mach numbers which are presented.

TABLE 21. INCREMENTAL PITCHING MOMENT SLOPE COEFFICIENT DUE TO INTERFERENCE - FIGURE LOCATION GUIDE

ΔC_{m_α} INTF	MACH NUMBER 0.7	0.9	1.05	1.2	1.6
	Figure Number				
Adj. Shoulder-Fwd. Cluster	725	726	727	728	729
Adj. Shoulder-Aft Cluster	725	726	727	728	729
℄ Store-Fwd. Cluster	730	731	732	733	734
℄ Store-Aft Cluster	730	731	732	733	734
Opposite Shoulder-Fwd. Cluster	735	736	737	738	739
Opposite Shoulder-Aft Cluster	735	736	737	738	739

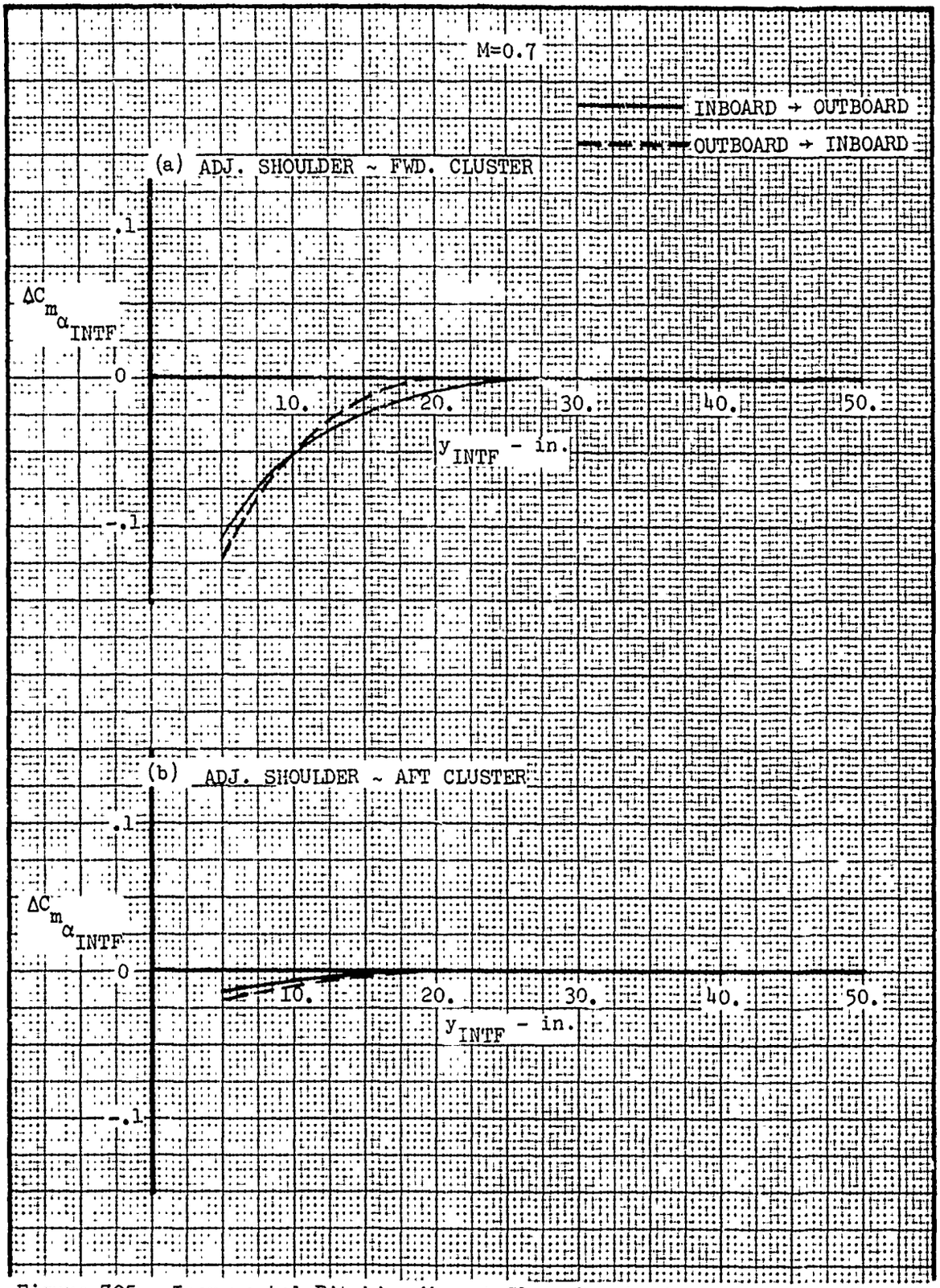


Figure 725. Incremental Pitching Moment Slope Due to Interference - Adjacent Shoulder at M=0.7

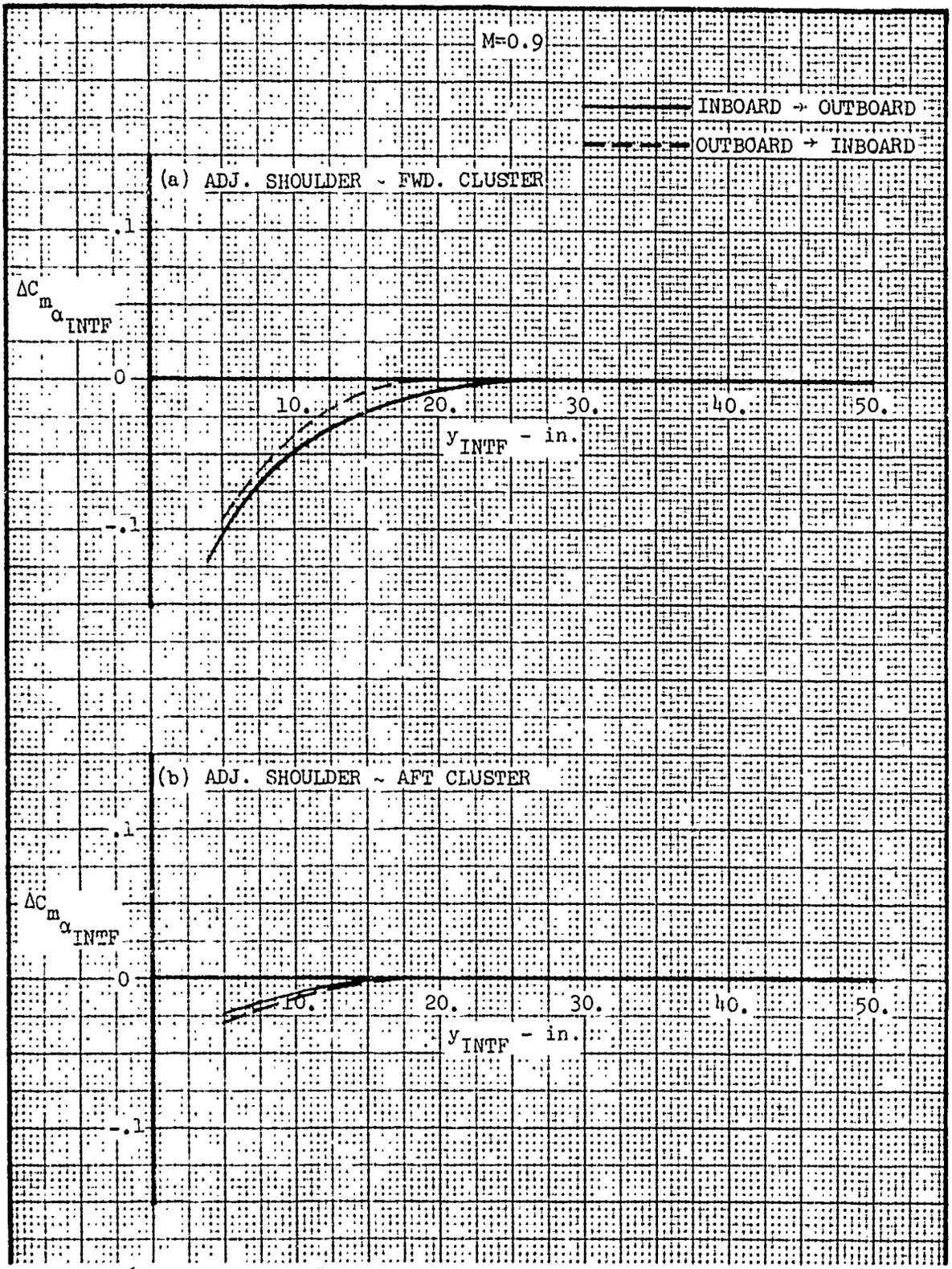


Figure 726. Incremental Pitching Moment Slope Due to Interference - Adjacent Shoulder at M=0.9

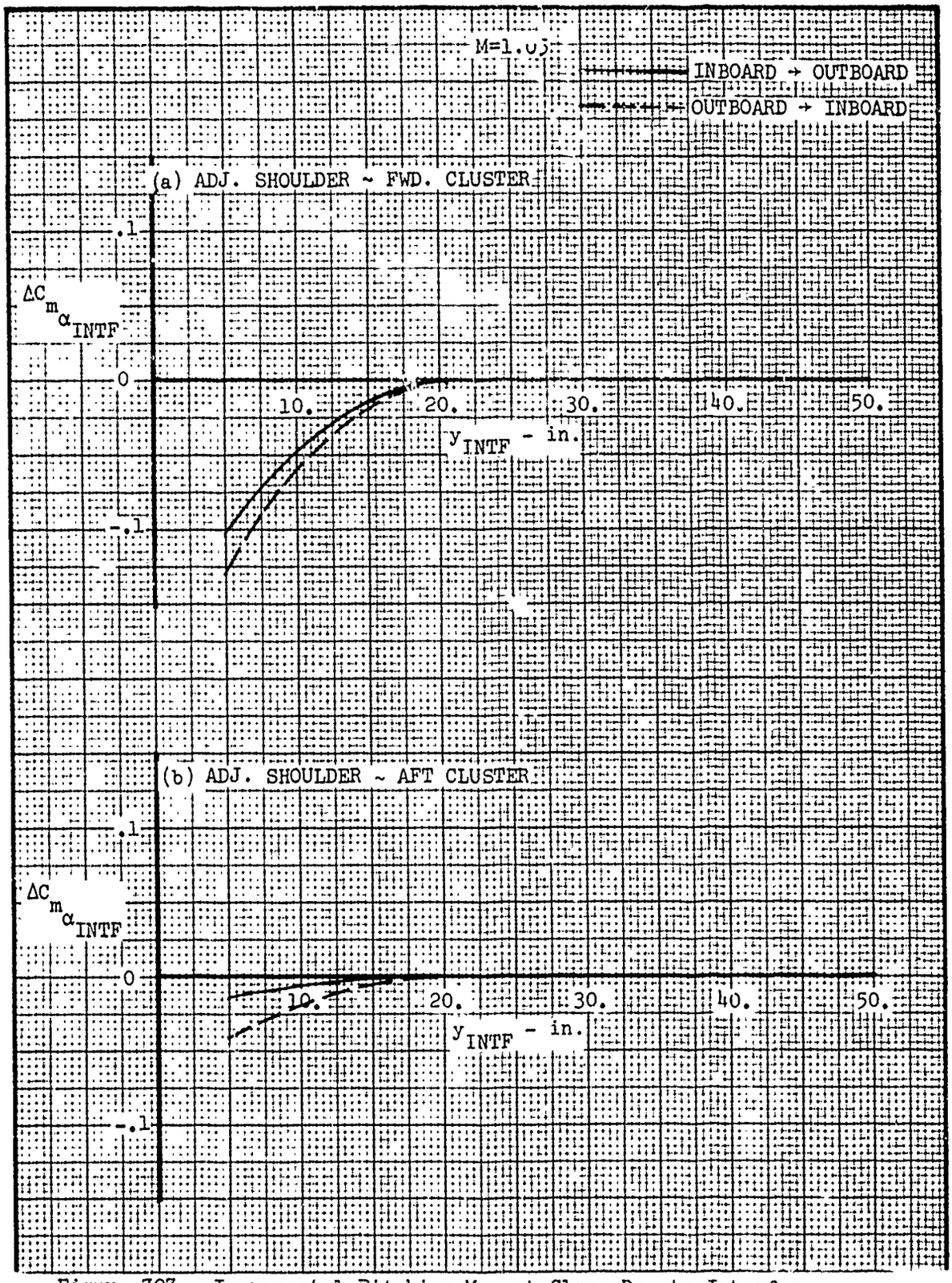


Figure 727. Incremental Pitching Moment Slope Due to Interference - Adjacent Shoulder at M=1.05

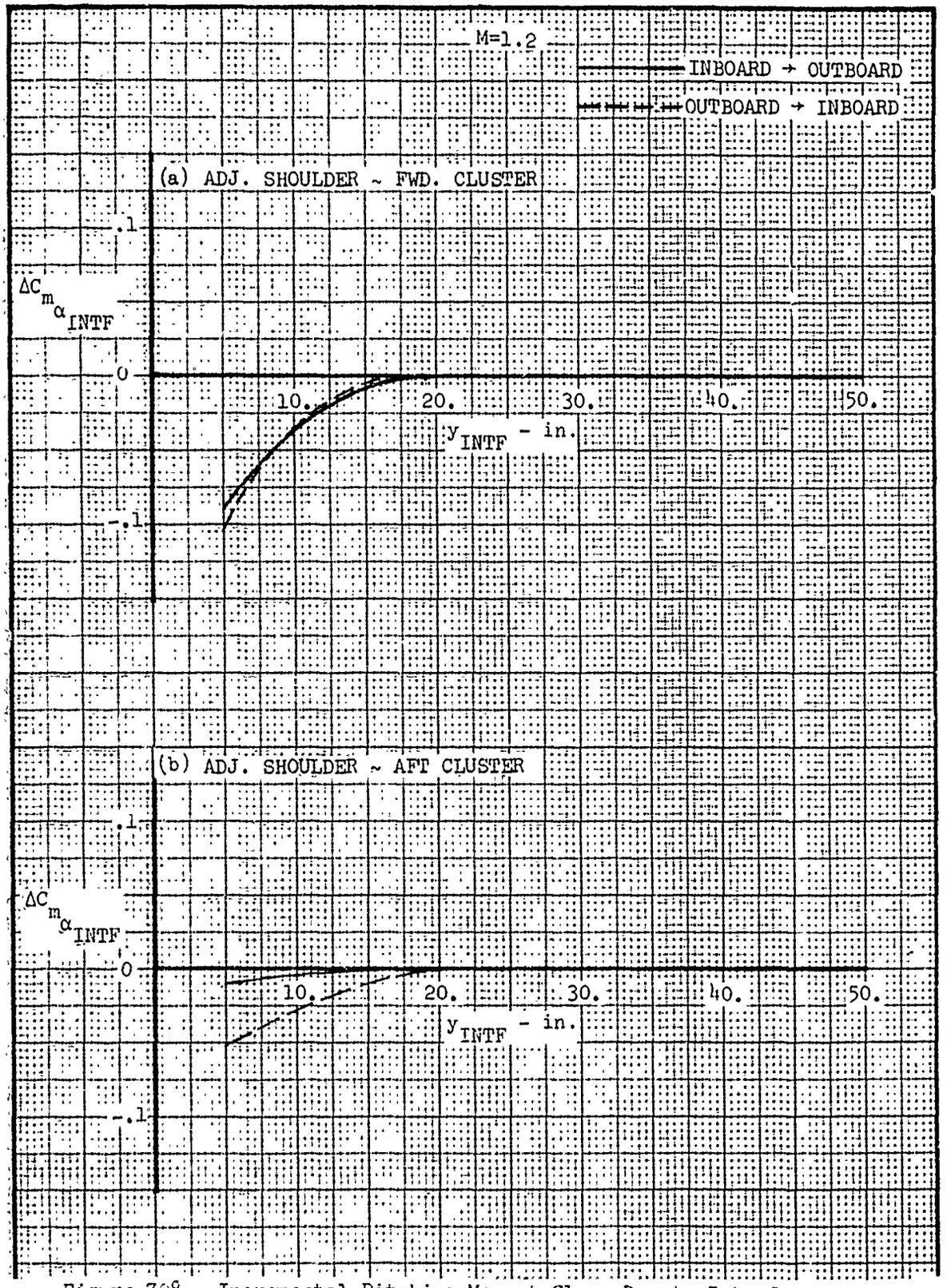


Figure 728. Incremental Pitching Moment Slope Due to Interference - Adjacent Shoulder at M=1.2

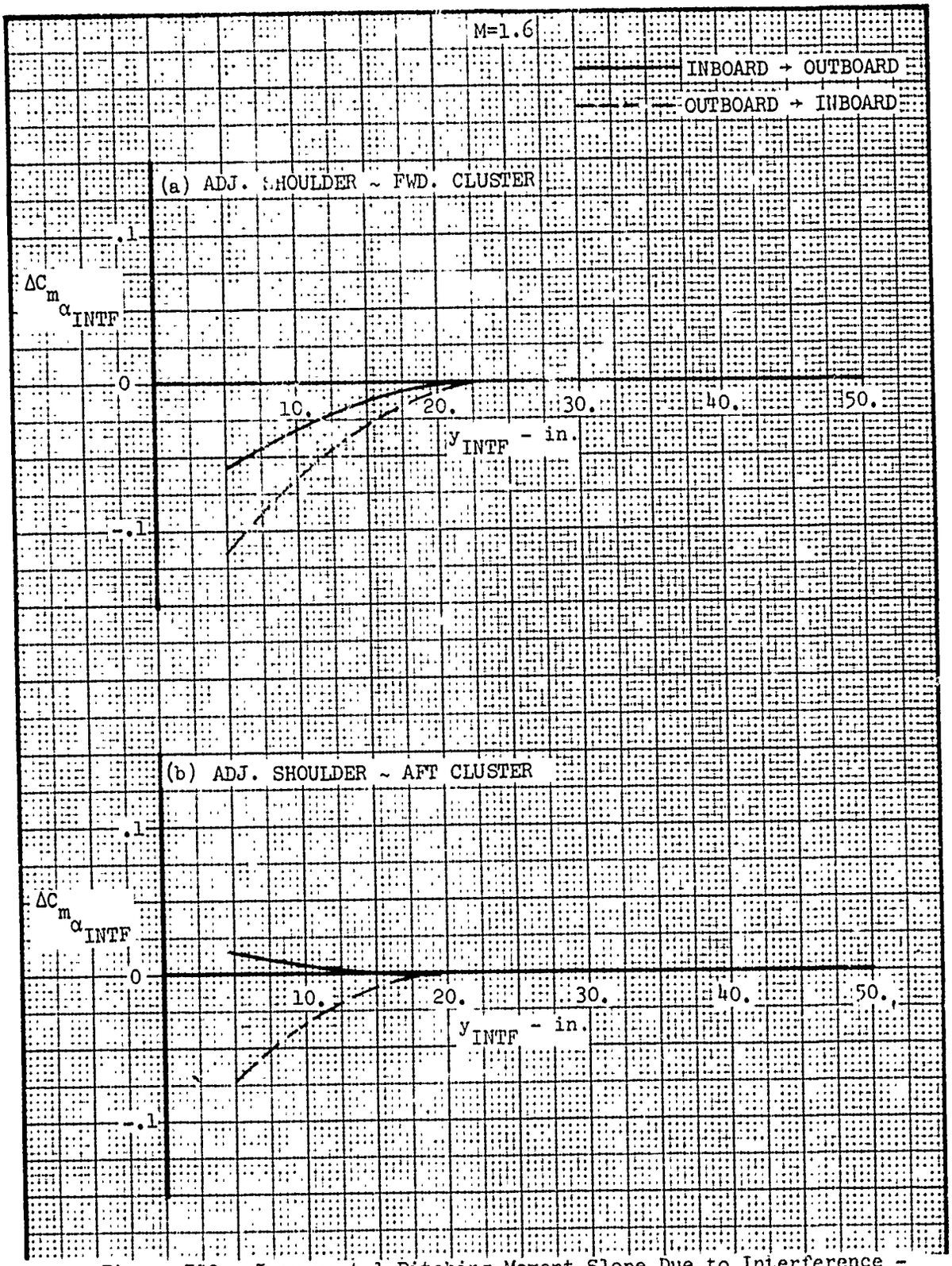


Figure 729. Incremental Pitching Moment Slope Due to Interference - Adjacent Shoulder at M=1.6

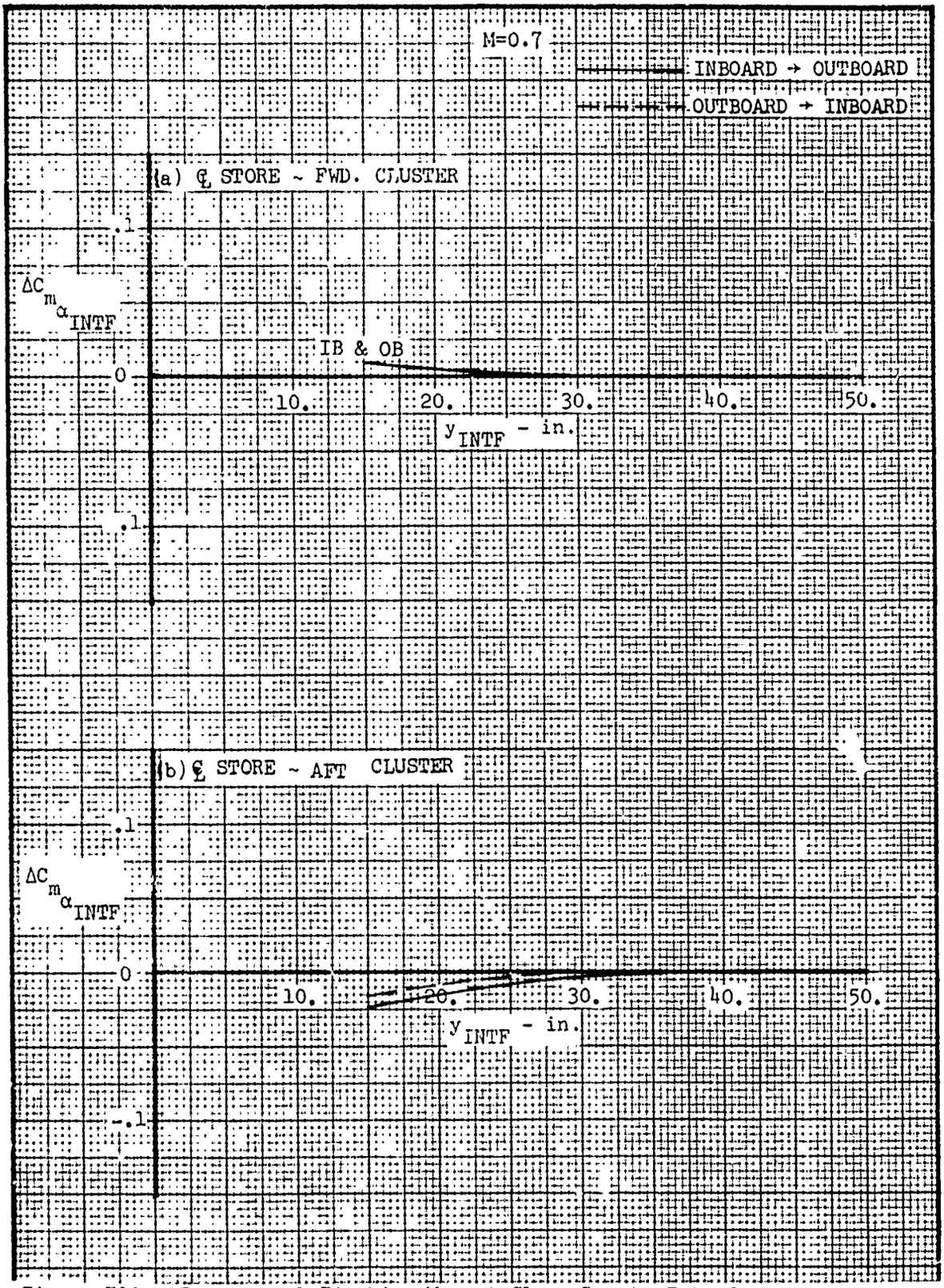


Figure 730. Incremental Pitching Moment Slope Due to Interference - Centerline Store at M=0.7

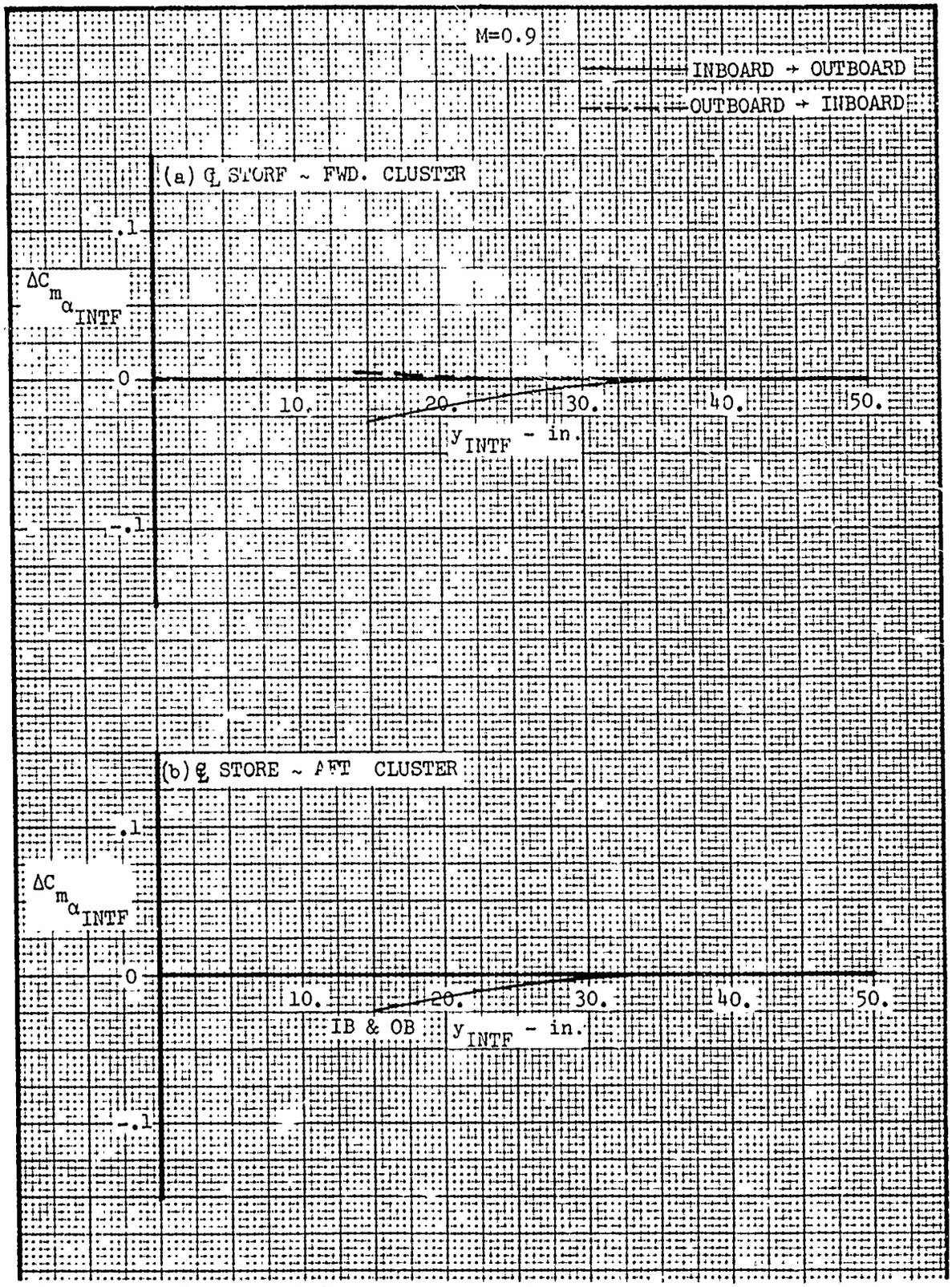


Figure 731. Incremental Pitching Moment Slope Due to Interference - Centerline Store at M=0.9

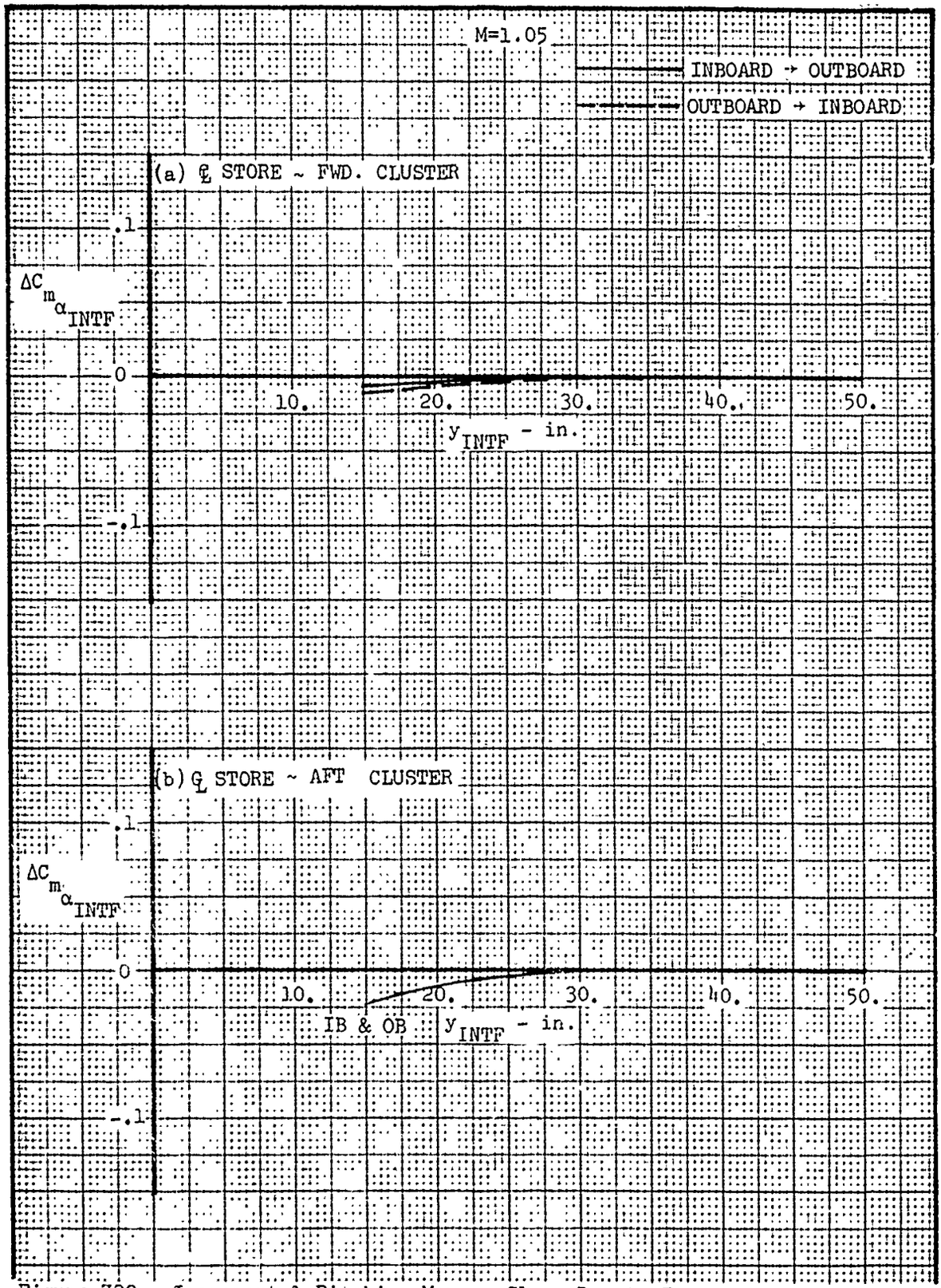


Figure 732. Incremental Pitching Moment Slope Due to Interference - Centerline Store at M=1.05

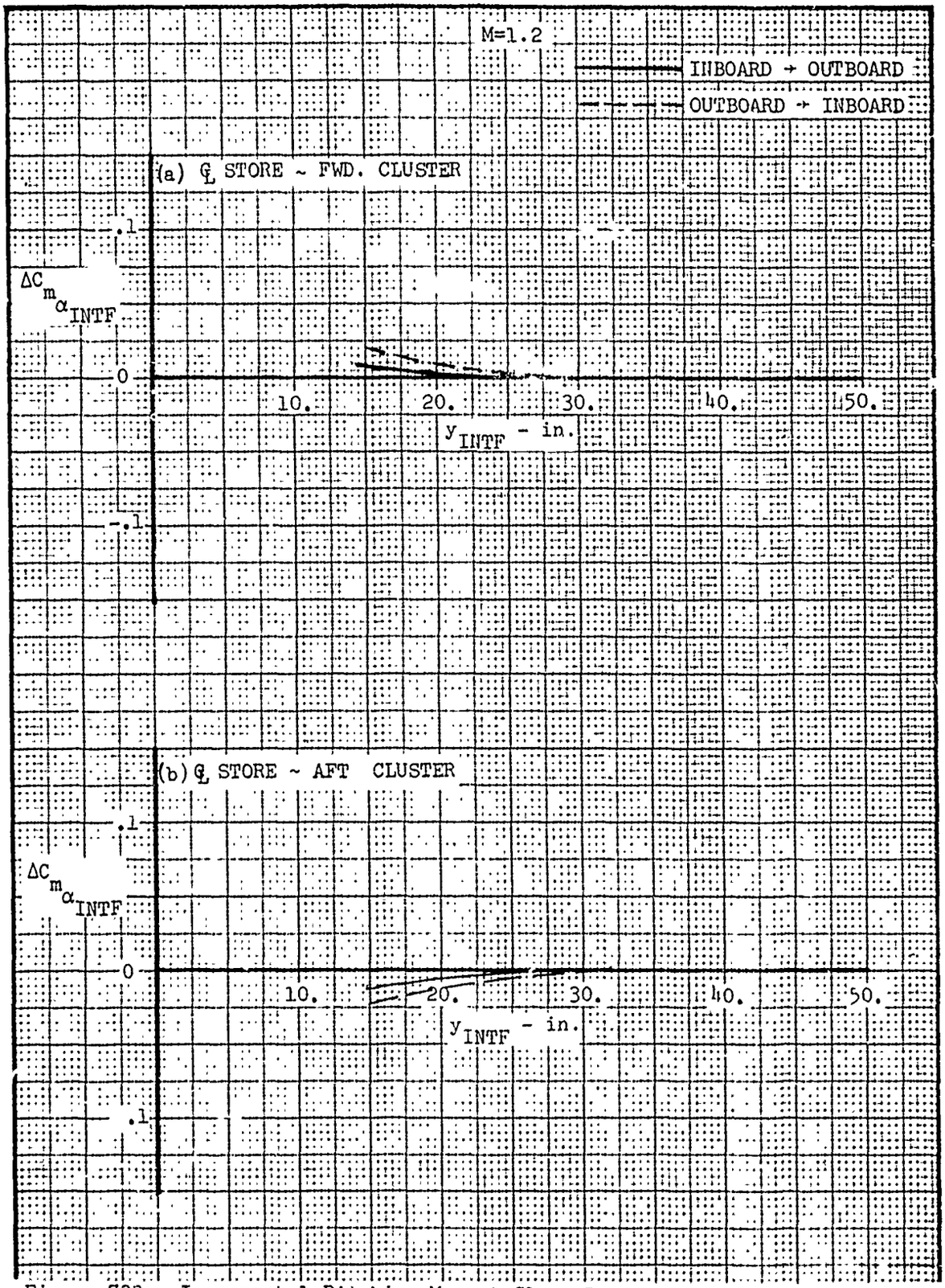


Figure 733. Incremental Pitching Moment Slope Due to Interference - Centerline Store at M=1.2

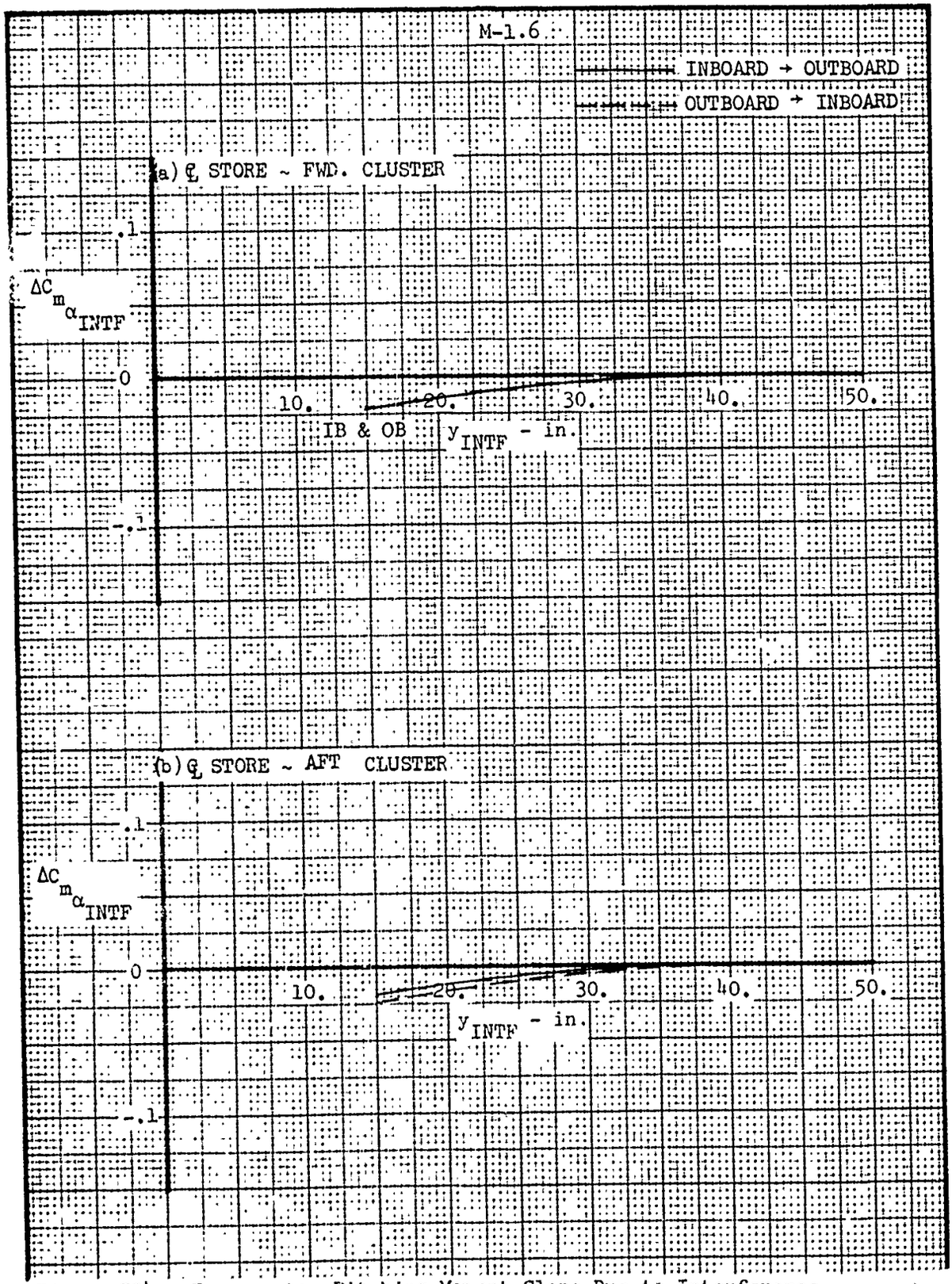


Figure 734. Incremental Pitching Moment Slope Due to Interference - Centerline Store at M=1.6

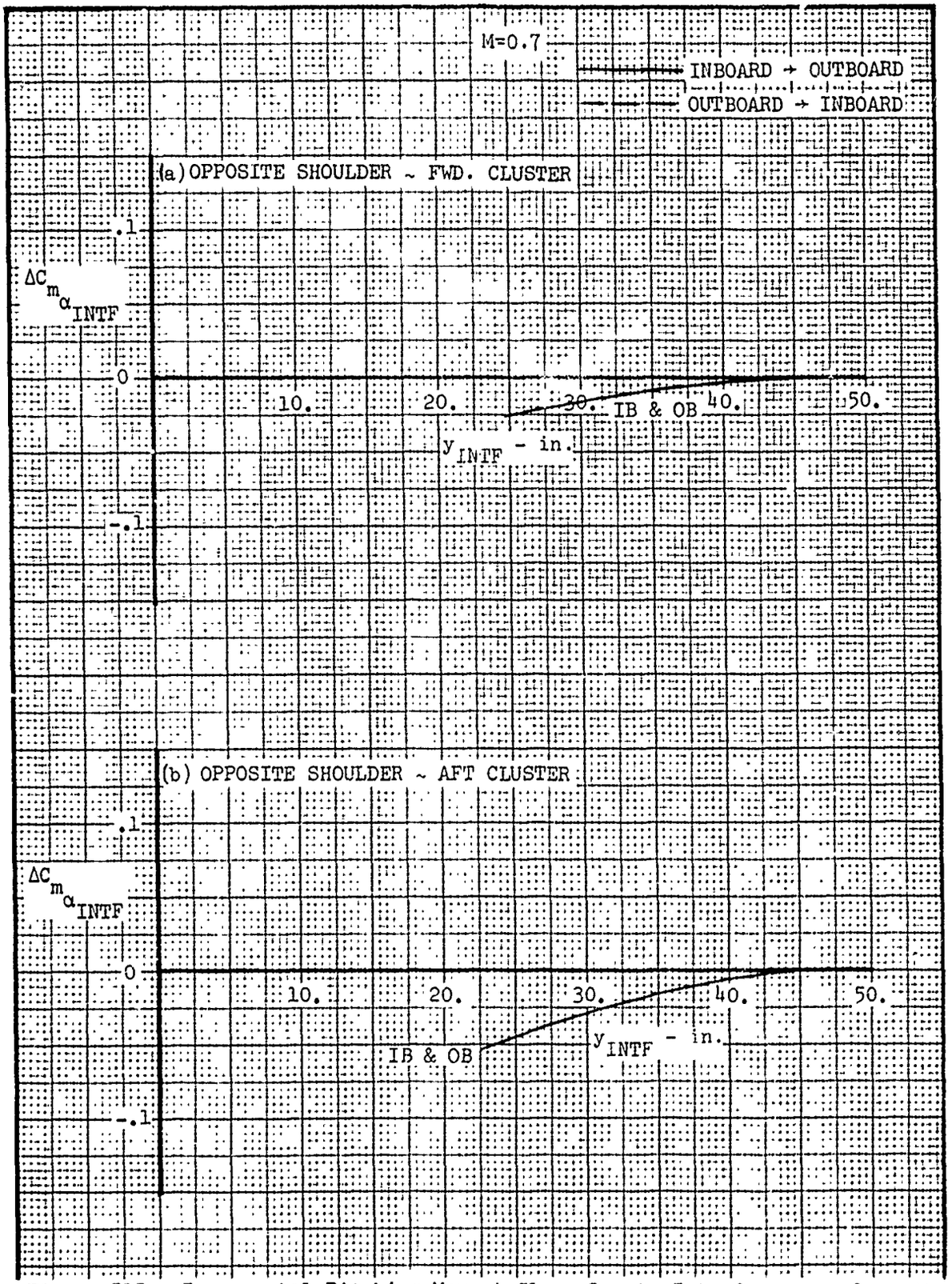


Figure 735. Incremental Pitching Moment Slope Due to Interference - Opposite Shoulder at M=0.7

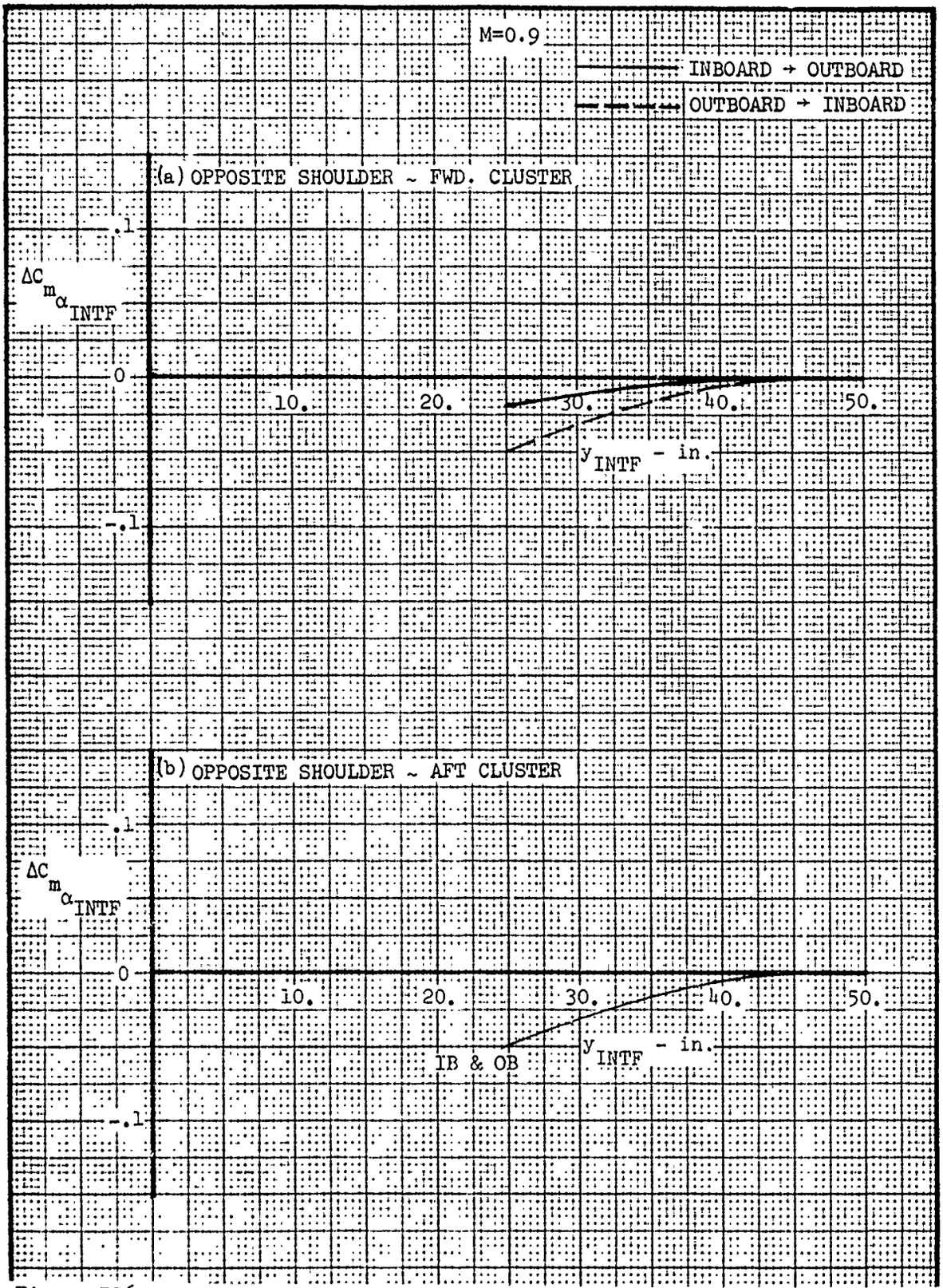


Figure 736. Incremental Pitching Moment Slope Due to Interference - Opposite Shoulder at M=0.9

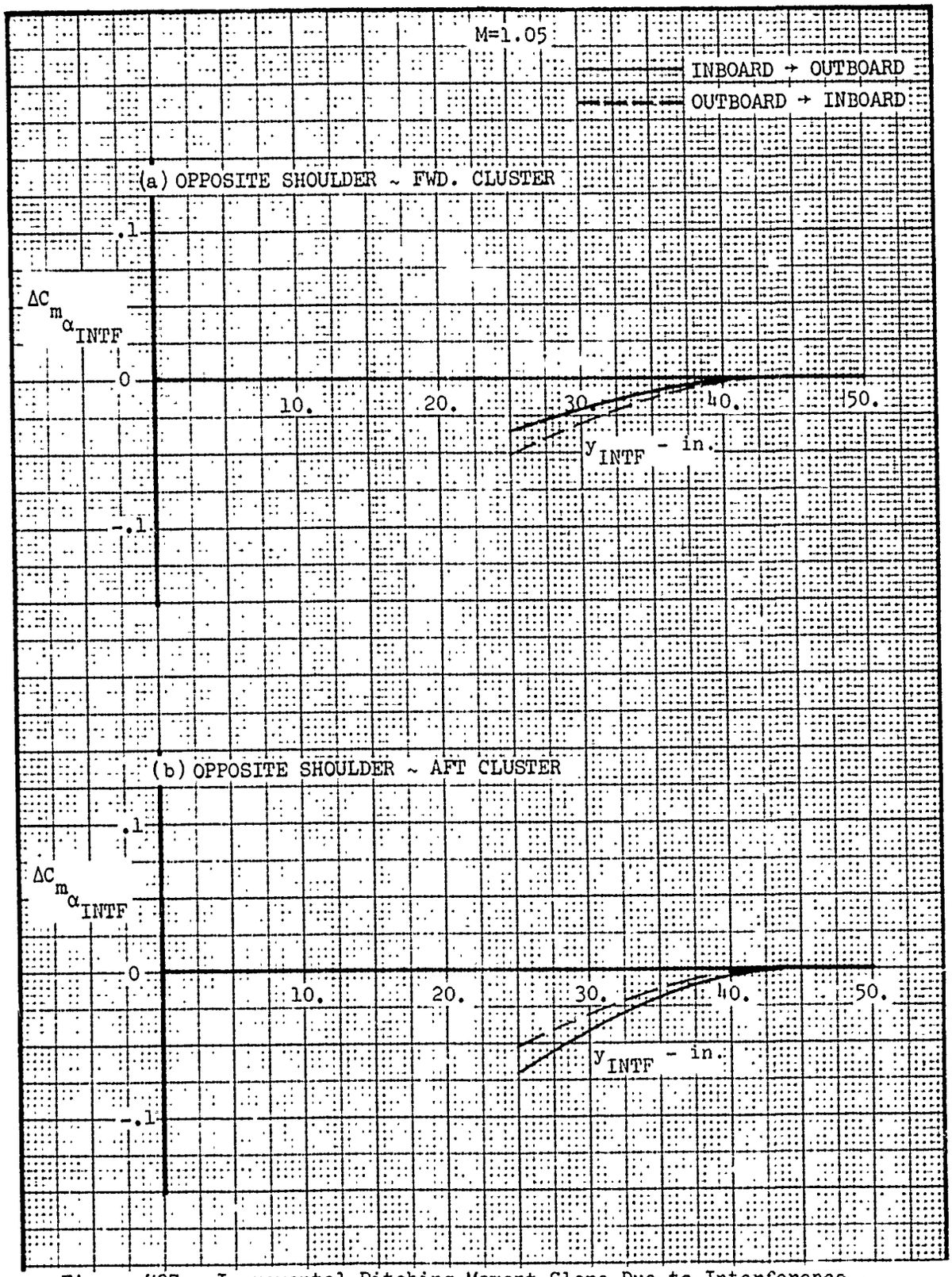


Figure 737. Incremental Pitching Moment Slope Due to Interference - Opposite Shoulder at M=1.05

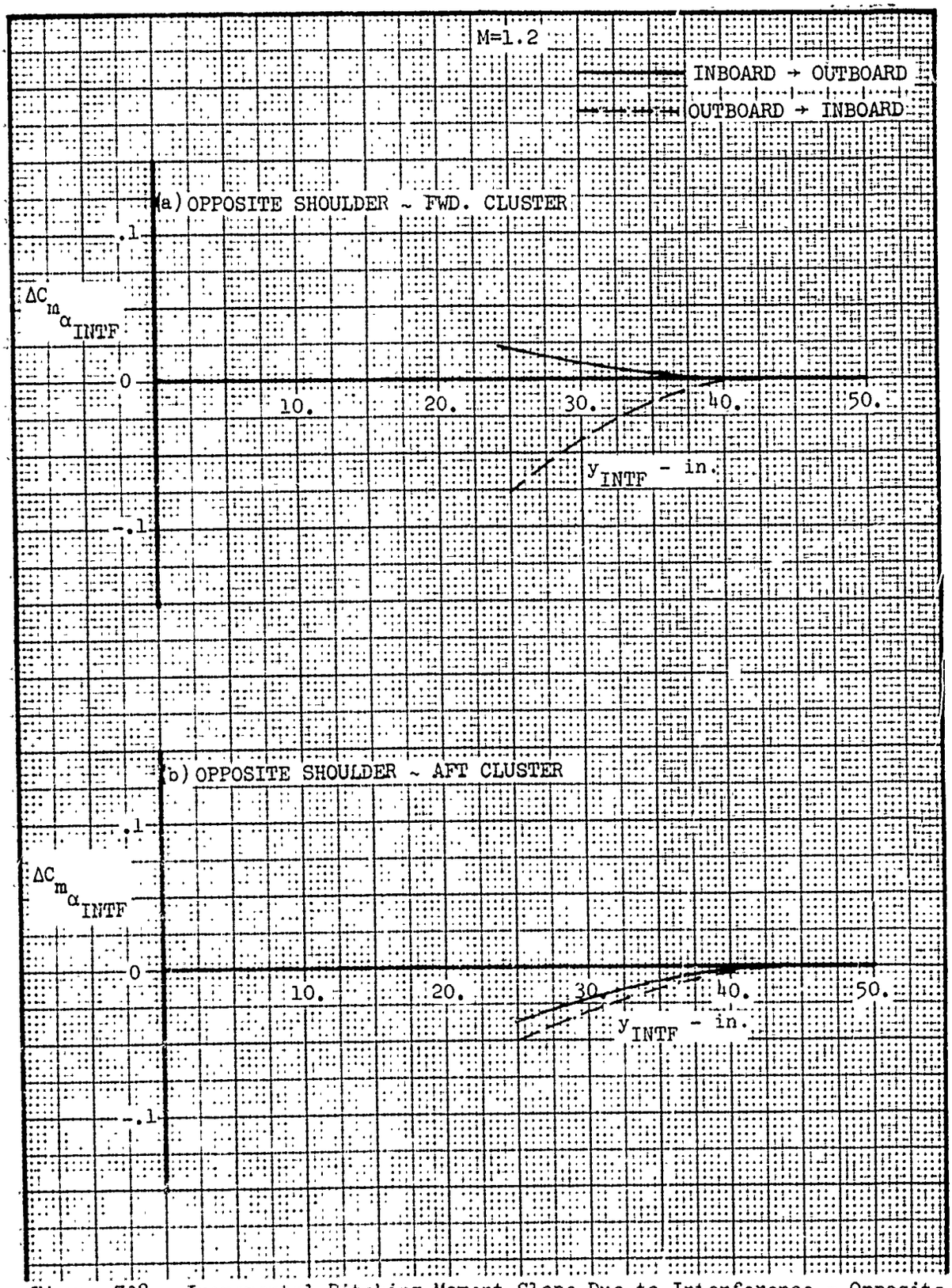


Figure 738. Incremental Pitching Moment Slope Due to Interference - Opposite Shoulder at M=1.2

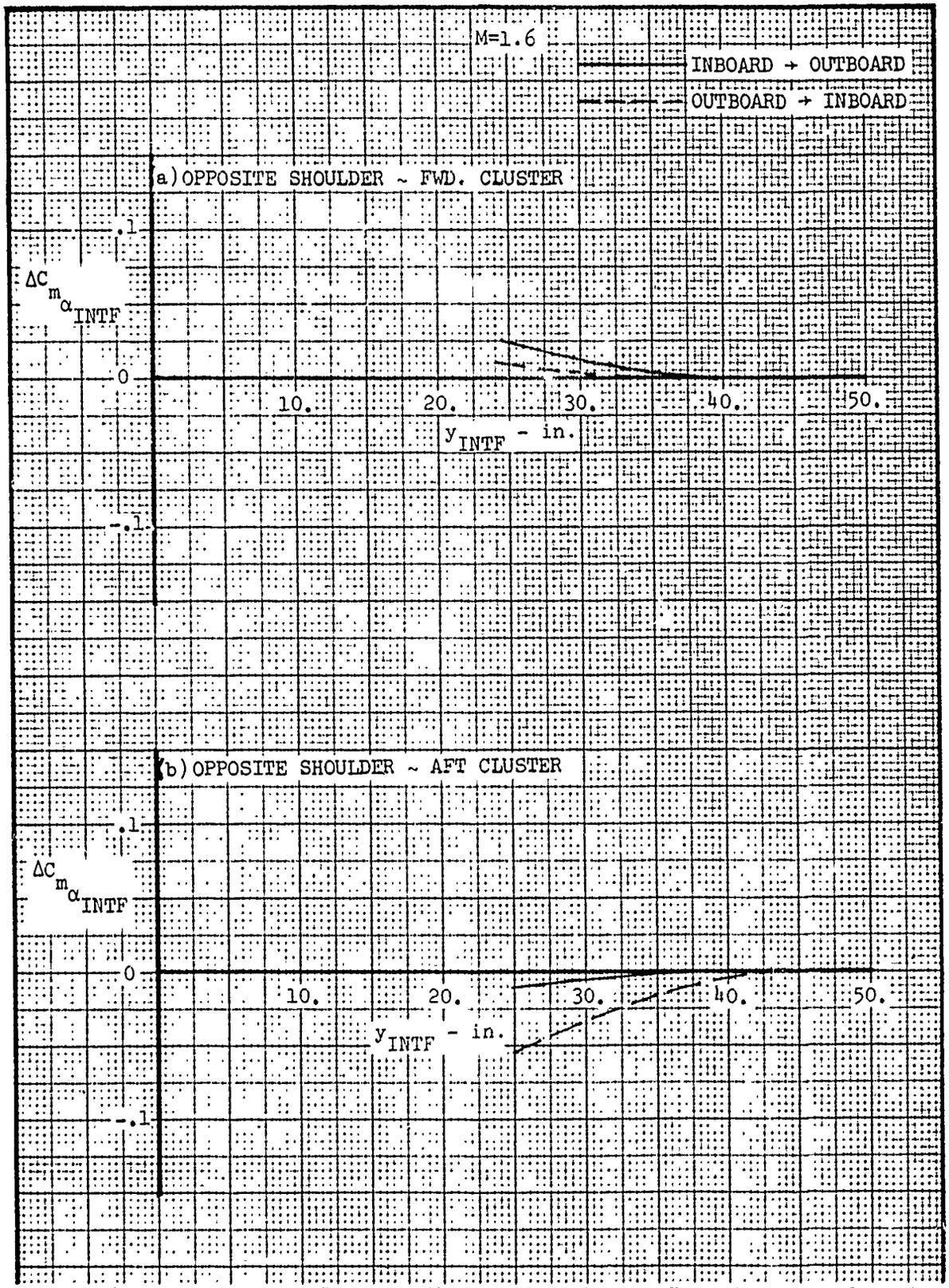


Figure 739. Incremental Pitching Moment Slope Due to Interference - Opposite Shoulder at M=1.6

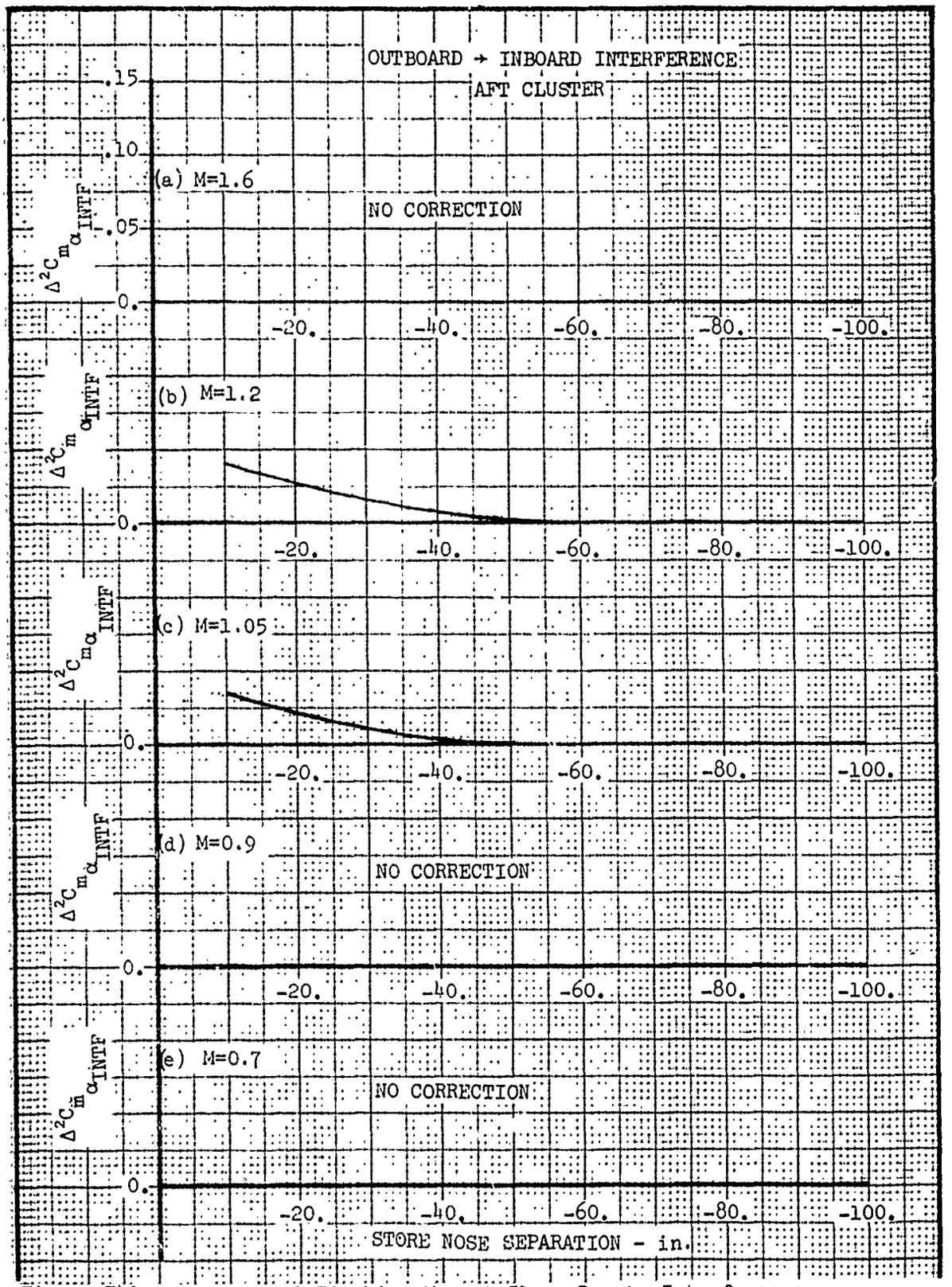


Figure 740. Incremental Pitching Moment Slope Due to Interference - Outboard to Inboard Interference Correction for the Aft Cluster

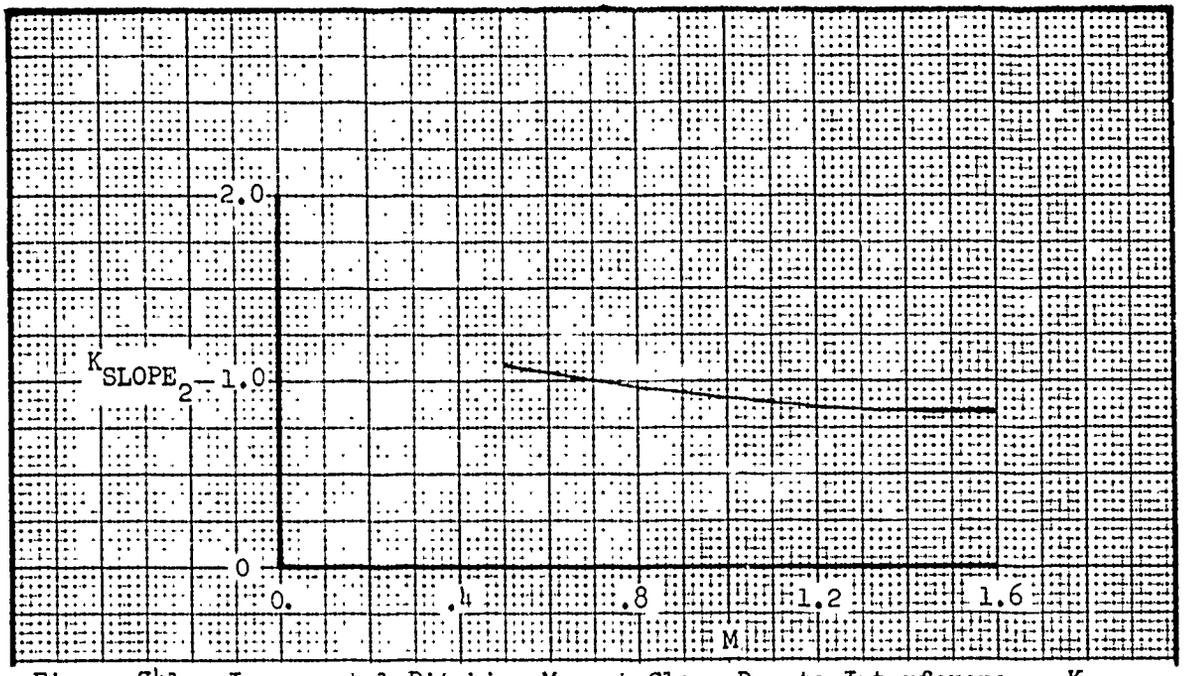


Figure 741. Incremental Pitching Moment Slope Due to Interference - K_{SLOPE_2} for Combination Inboard and Outboard Interference

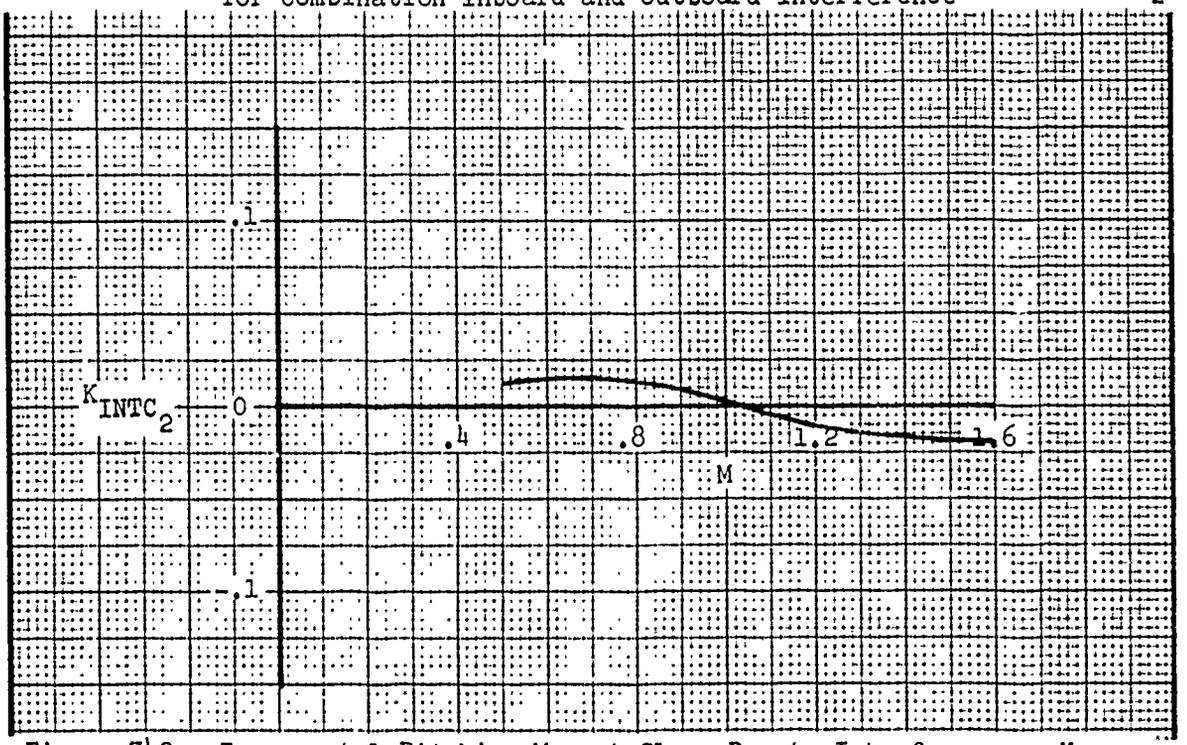


Figure 742. Incremental Pitching Moment Slope Due to Interference - K_{INTC_2} for Combination Inboard and Outboard Interference

4.4.3.2 Intercept Prediction

The equations governing the prediction of incremental pitching moment at $\alpha=0$ are presented below.

INTERFERING STORES CARRIED INBOARD

MER STATIONS 1,2,3,4,5, and 6 (MS1-6):

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ INTF \\ MS1-6}} = \left(\sum \Delta C_{m_{\substack{\alpha=0 \\ INTF \\ IB\rightarrow OB \\ MS1-6}}}\right) K_{SCALE_{PM}}$$

where:

$\Delta C_{m_{\substack{\alpha=0 \\ INTF \\ IB\rightarrow OB}}}$ - Incremental pitching moment intercept coefficient due to inboard to outboard interference as a function of y_{INTF}, see Table 22.

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

INTERFERING STORES CARRIED OUTBOARD

MER STATIONS 1,2,3,4,5, and 6 (MS1-6):

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ INTF \\ MS1-6}} = \left(\sum \Delta C_{m_{\substack{\alpha=0 \\ INTF \\ OB\rightarrow IB \\ MS1-6}}} + \sum \Delta^2 C_{m_{\substack{\alpha=0 \\ INTF \\ MS1,3,5}}}\right) K_{SCALE_{PM}}$$

where:

$\Delta C_{m_{\substack{\alpha=0 \\ INTF \\ OB\rightarrow IB}}}$ - Incremental pitching moment intercept coefficient due to outboard to inboard interference as a function of y_{INTF}, see Table 22.

$\Delta^2 C_{m_{\substack{\alpha=0 \\ INTF}}}$ - Increment to $\Delta C_{m_{\substack{\alpha=0 \\ INTF \\ OB\rightarrow IB}}}$ for the aft cluster as a function of store nose separation, $\sqrt{x^2_{INTF} + y^2_{INTF}}$ (see Subsection 3.1.3), which is assumed to be negative when the interfering store is aft of the subject captive store, Figure 758.

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

INTERFERING STORES CARRIED INBOARD AND OUTBOARD

MER STATIONS 1,2,3,4,5, and 6 (MS1-6):

AT A GIVEN MACH NUMBER:

$$\Delta\left(\frac{PM}{q}\right)_{\substack{\alpha=0 \\ INTF \\ MS1-6}} = \left[K_{INTC_1} + K_{SLOPE_1}\left(\sum \Delta C_{m_{\substack{\alpha=0 \\ INTF \\ IB\rightarrow OB \\ MS1-6}}} + \sum \Delta C_{m_{\substack{\alpha=0 \\ INTF \\ OB\rightarrow IB \\ MS1-6}}} + \sum \Delta^2 C_{m_{\substack{\alpha=0 \\ INTF \\ MS1,3,5}}}\right)\right] K_{SCALE_{PM}}$$

where:

K_{INTC_1} - Intercept for the inboard - outboard combination correction for pitching moment intercept, Figure 760.

K_{SLOPE_1} - Slope for the inboard-outboard combination correction for pitching moment intercept, Figure 759.

$\Delta C_{m_{\substack{\alpha=0 \\ INTF \\ IB \rightarrow OB}}}$ - Previously defined.

$\Delta C_{m_{\substack{\alpha=0 \\ INTF \\ OB \rightarrow IB}}}$ - Previously defined.

$\Delta^2 C_{m_{\substack{\alpha=0 \\ INTF}}}$ - Previously defined.

$K_{SCALE_{PM}}$ - Pitching moment scale factor, ft^3, see Section IV.

The above equations define the interference increment calculation at a given Mach number. For Mach numbers other than those presented, M = 0.7, 0.9, 1.05, 1.2, 1.6, these guidelines should be followed. If the subject Mach number is less than M = 0.7, use the value at M = 0.7. For other Mach numbers linear interpolation should be used between the Mach numbers which are presented.

TABLE 22. INCREMENTAL PITCHING MOMENT INTERCEPT COEFFICIENT DUE TO INTERFERENCE - FIGURE LOCATION GUIDE

$\Delta C_{m_{\alpha=C}}$ INTF	Mach Number 0.7	0.9	1.05	1.2	1.6
	Figure Number				
Adj. Shoulder-Fwd. Cluster	743	744	745	746	747
Adj. Shoulder-Aft Cluster	743	744	745	746	747
℄ Store-Fwd. Cluster	748	749	750	751	752
℄ Store-Aft Cluster	748	749	750	751	752
Opposite Shoulder-Fwd. Cluster	753	754	755	756	757
Opposite Shoulder-Aft Cluster	753	754	755	756	757

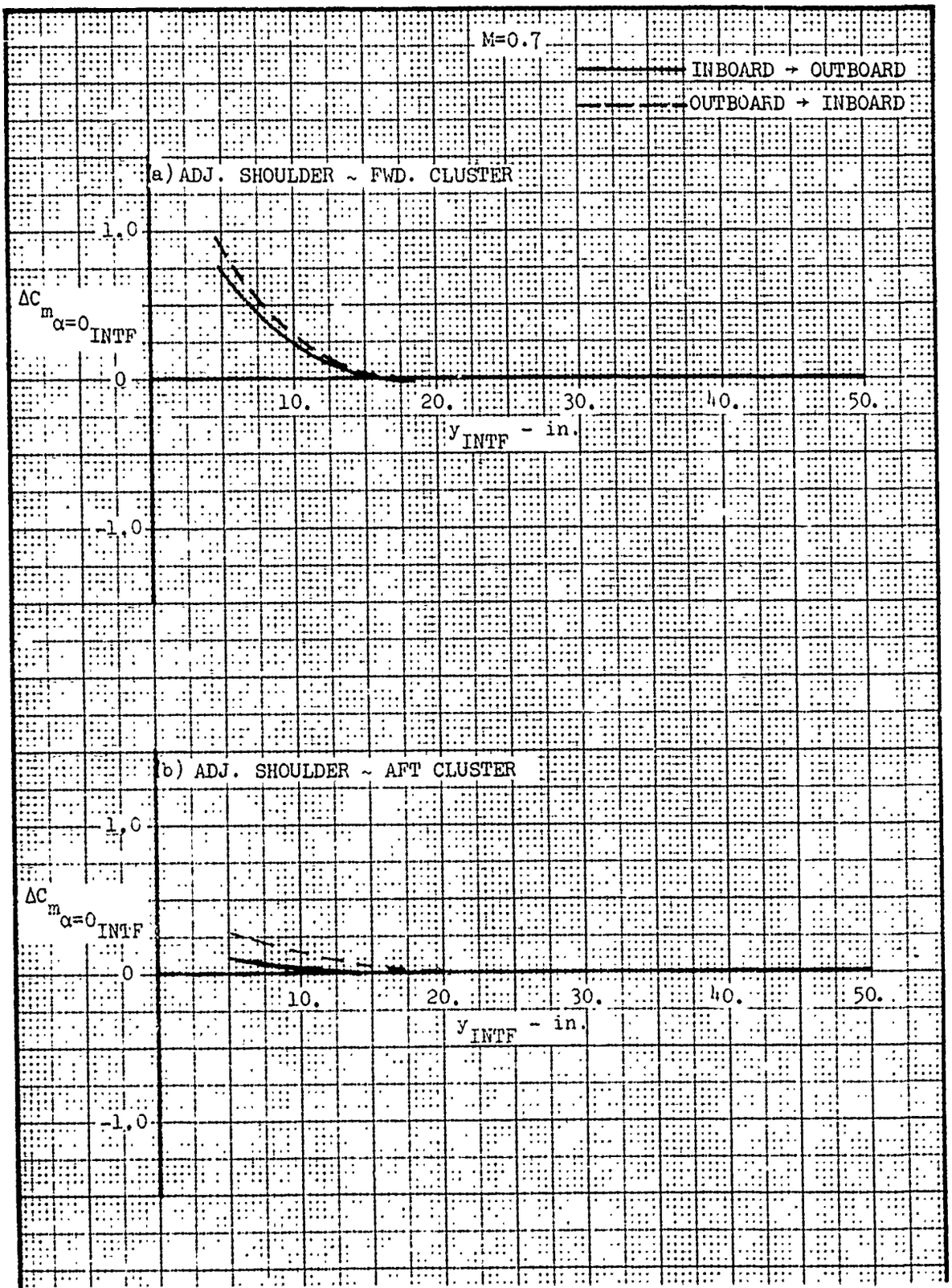


Figure 743. Incremental Pitching Moment Intercept Due to Interference - Adjacent Shoulder at M=0.7

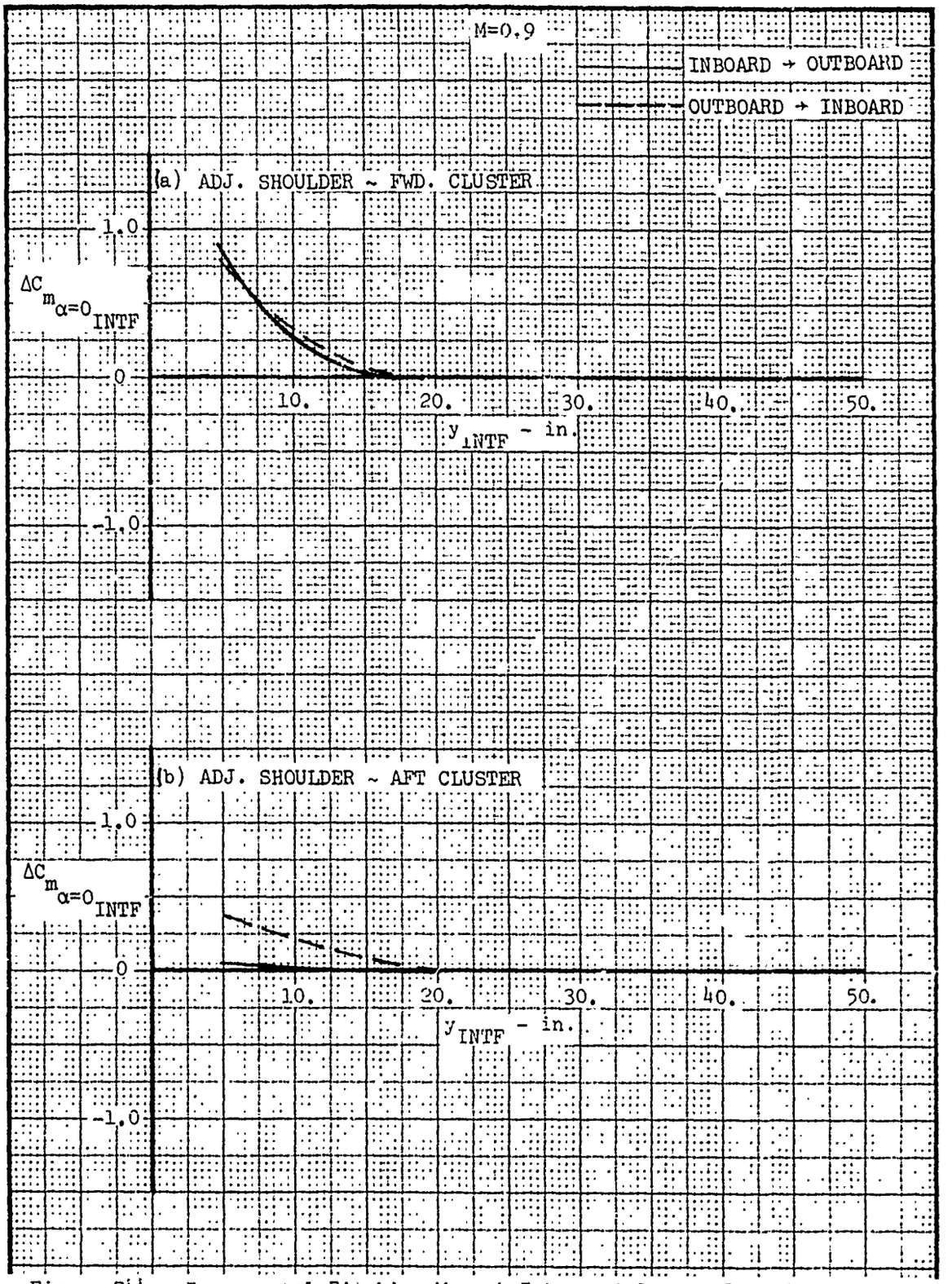


Figure 744. Incremental Pitching Moment Intercept Due to Interference - Adjacent Shoulder at M=0.9

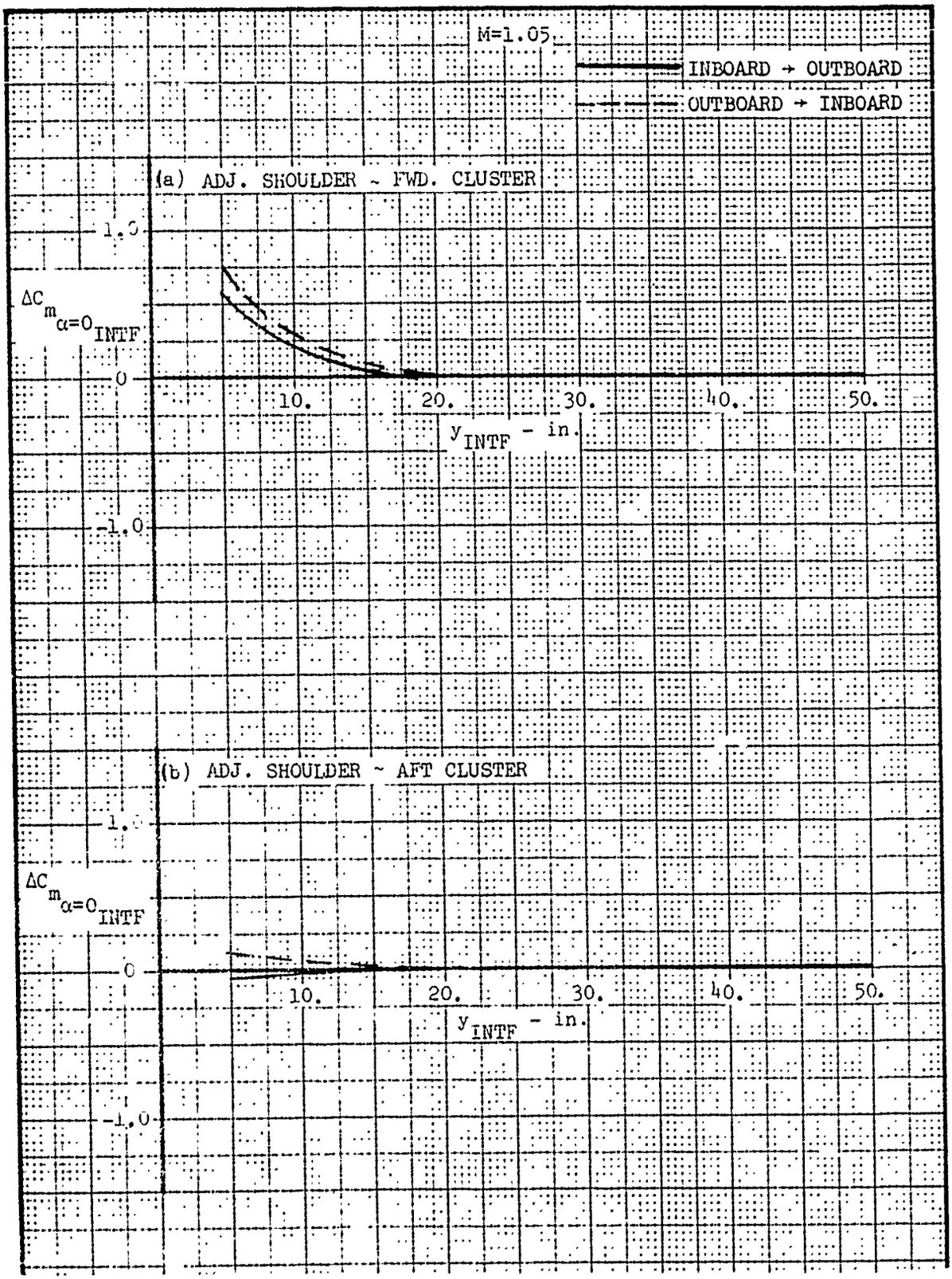


Figure 7.5. Incremental Pitching Moment Intercept Due to Interference - Adjacent Shoulder at M=1.05

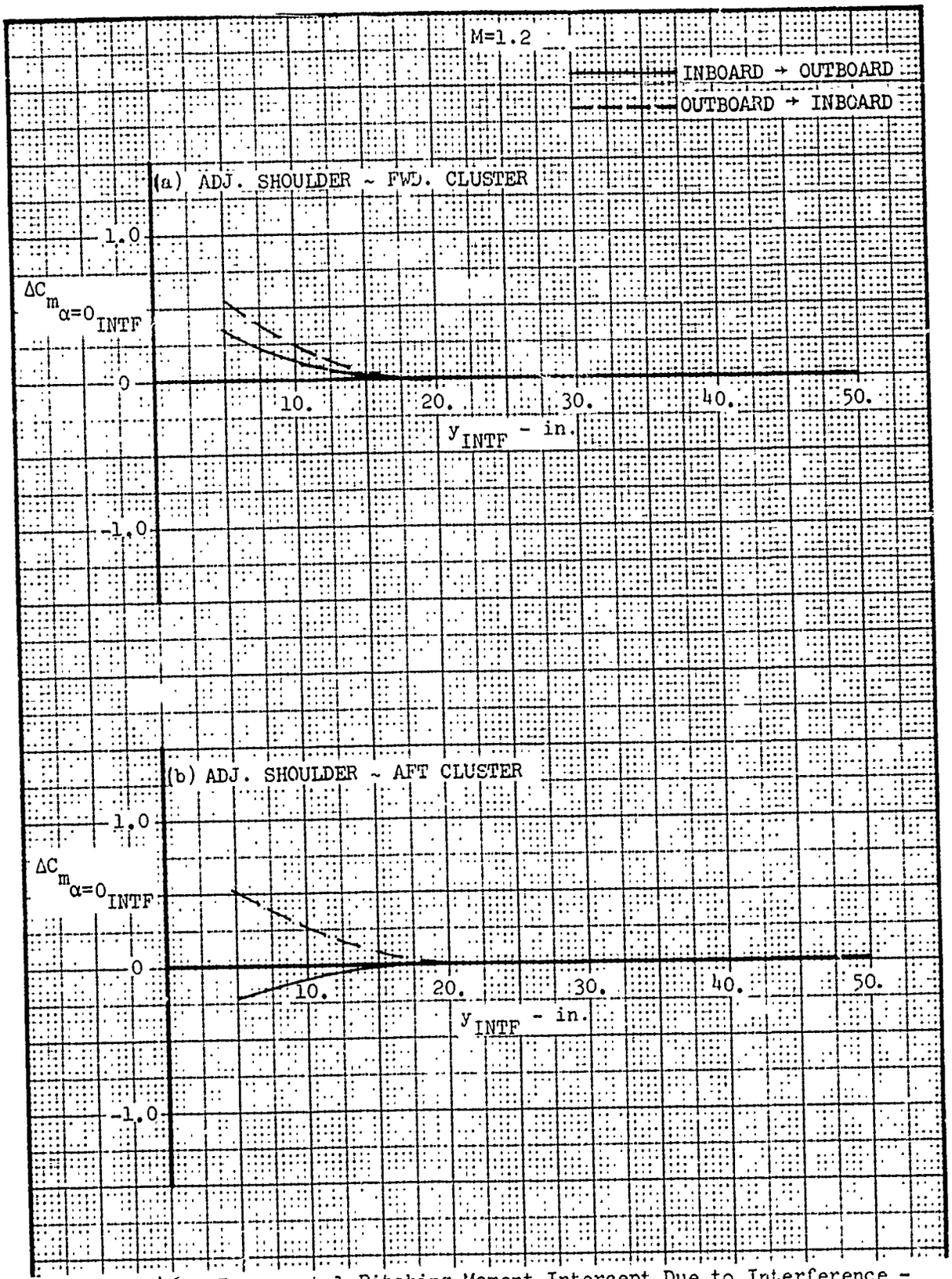


Figure 746. Incremental Pitching Moment Intercept Due to Interference - Adjacent Shoulder at M=1.2

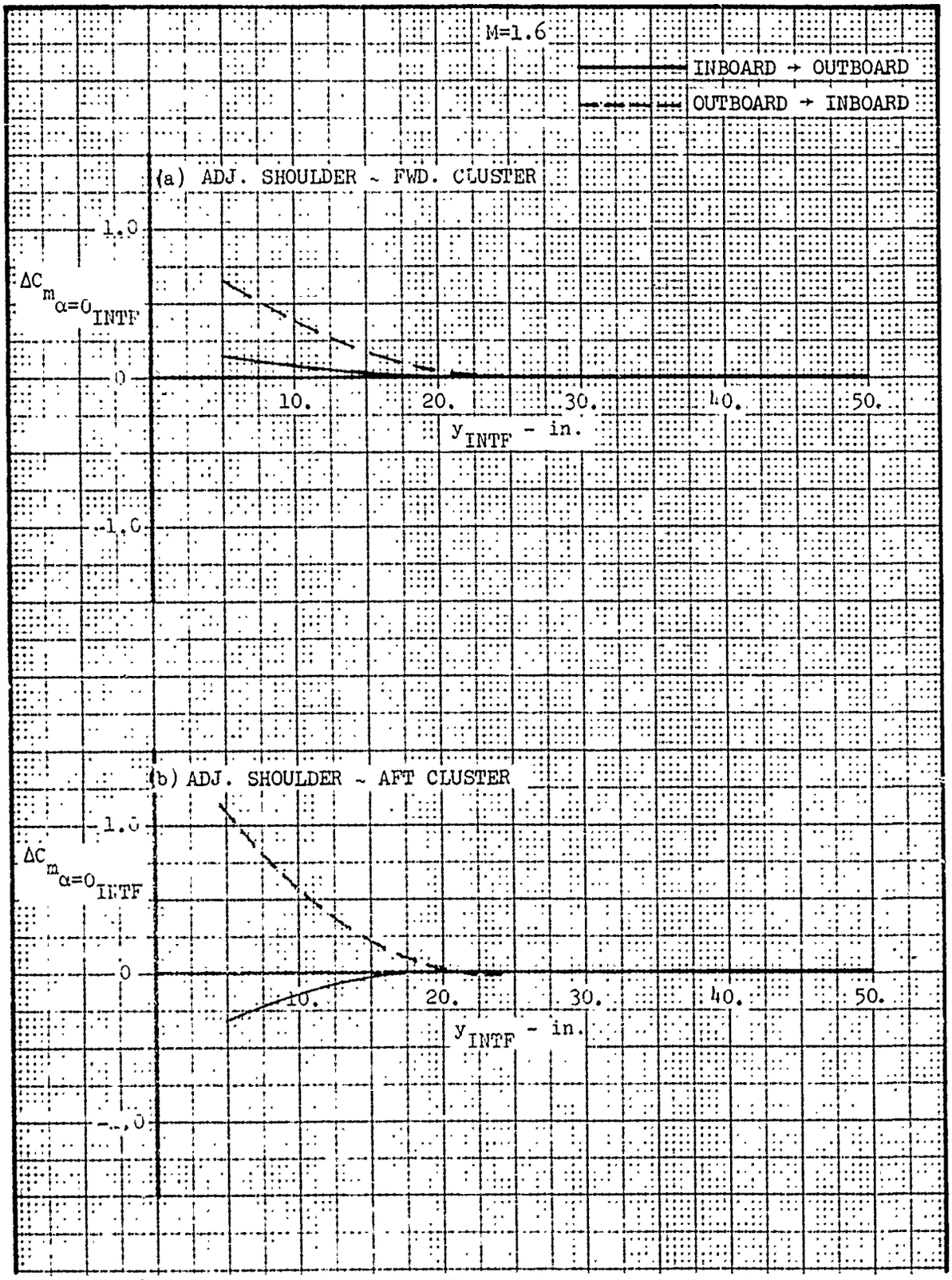


Figure 747. Incremental Pitching Moment Intercept Due to Interference - Adjacent Shoulder at M=1.6

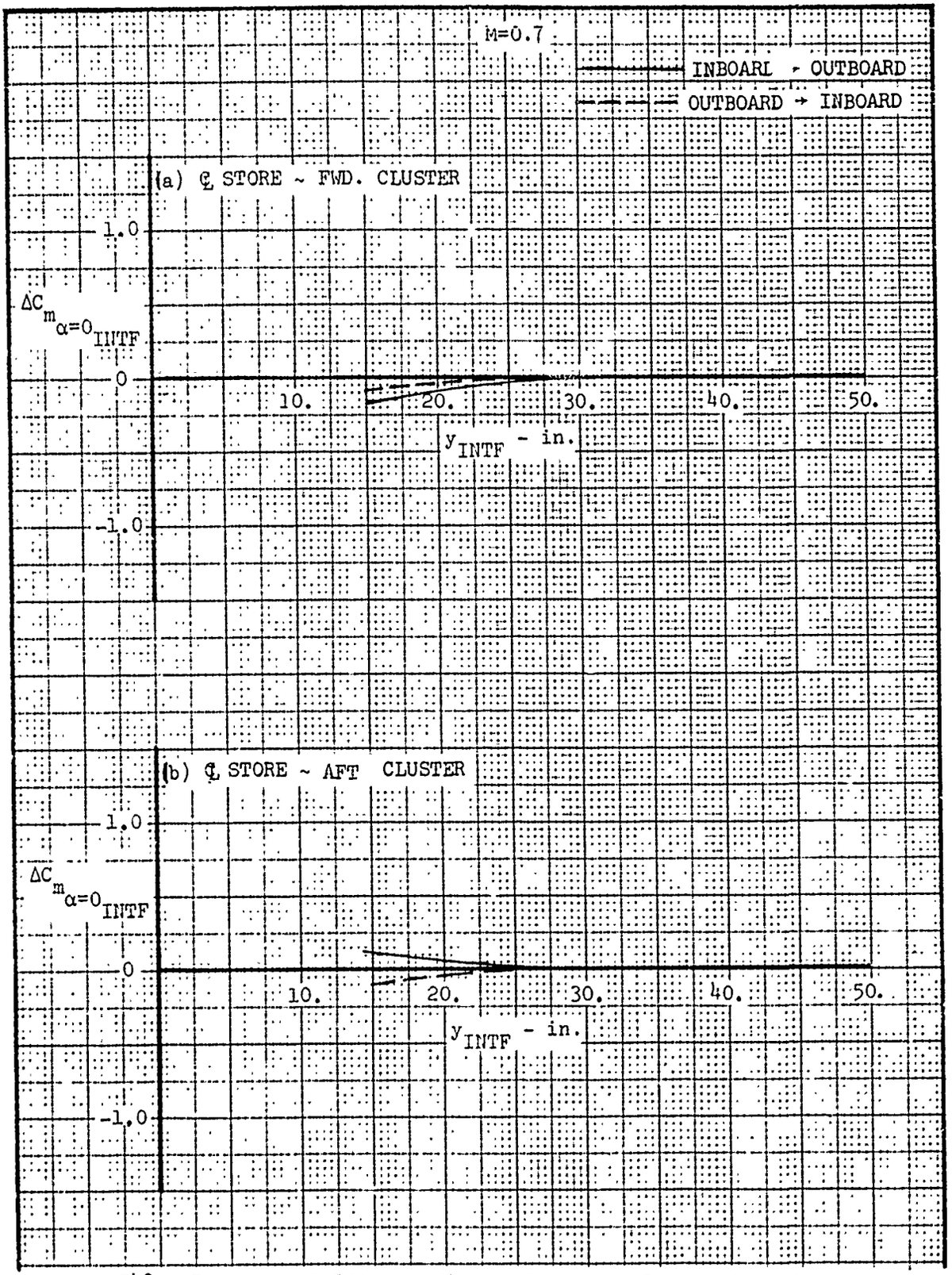


Figure 748. Incremental Pitching Moment Intercept Due to Interference - Centerline Store at M=0.7

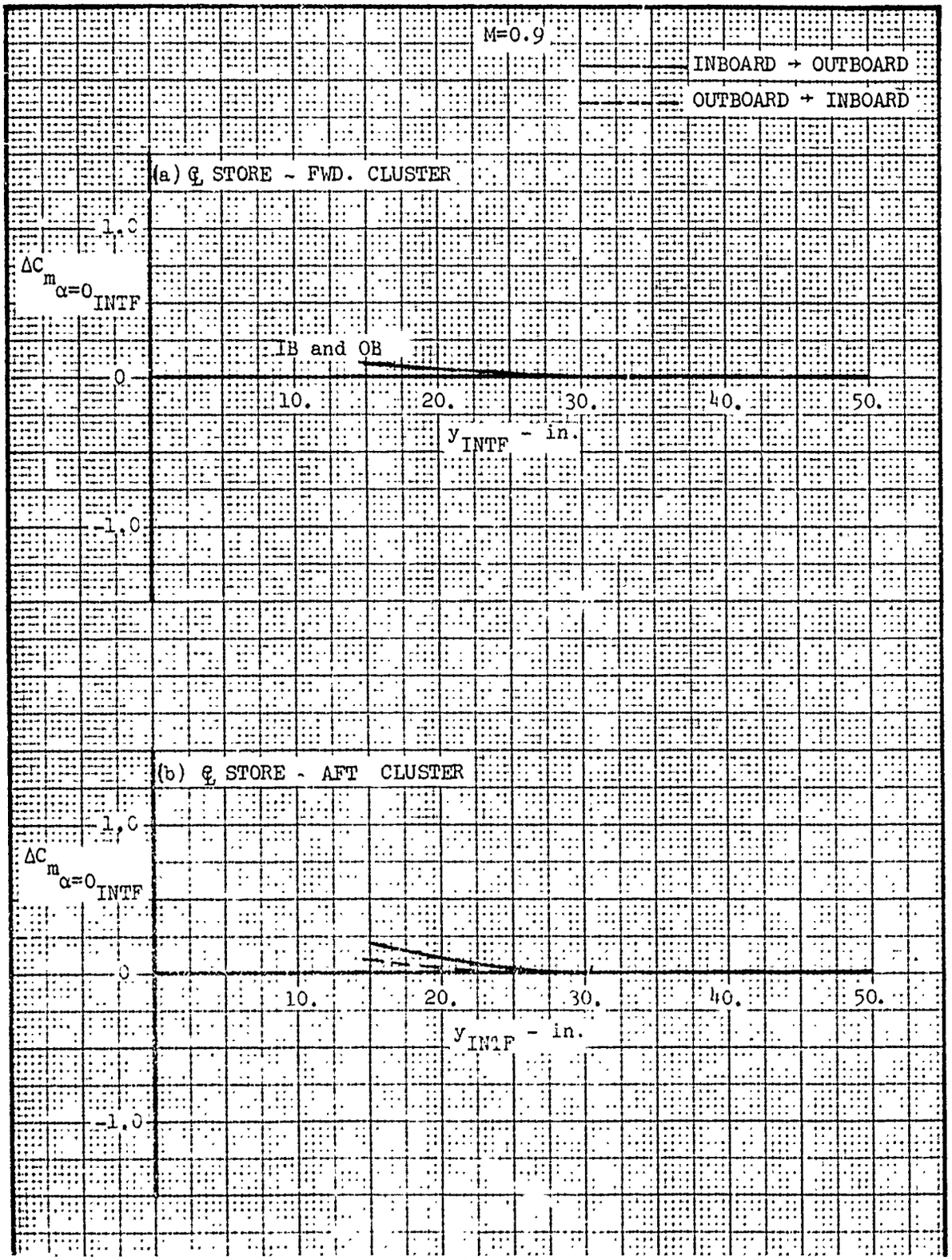


Figure 749. Incremental Pitching Moment Intercept Due to Interference - Centerline Store at M=0.9

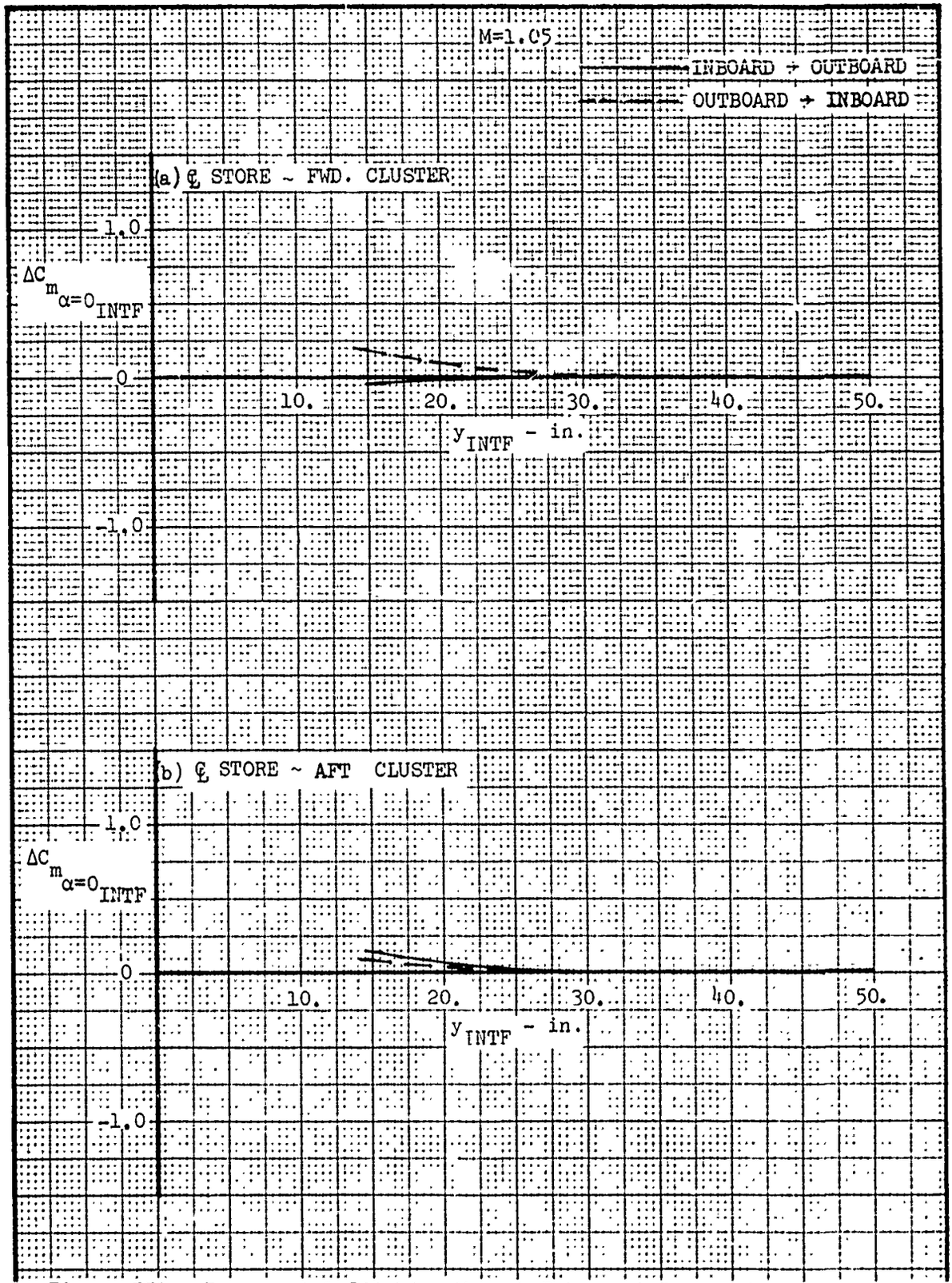


Figure 750. Incremental Pitching Moment Intercept Due to Interference - Centerline Store at M=1.05

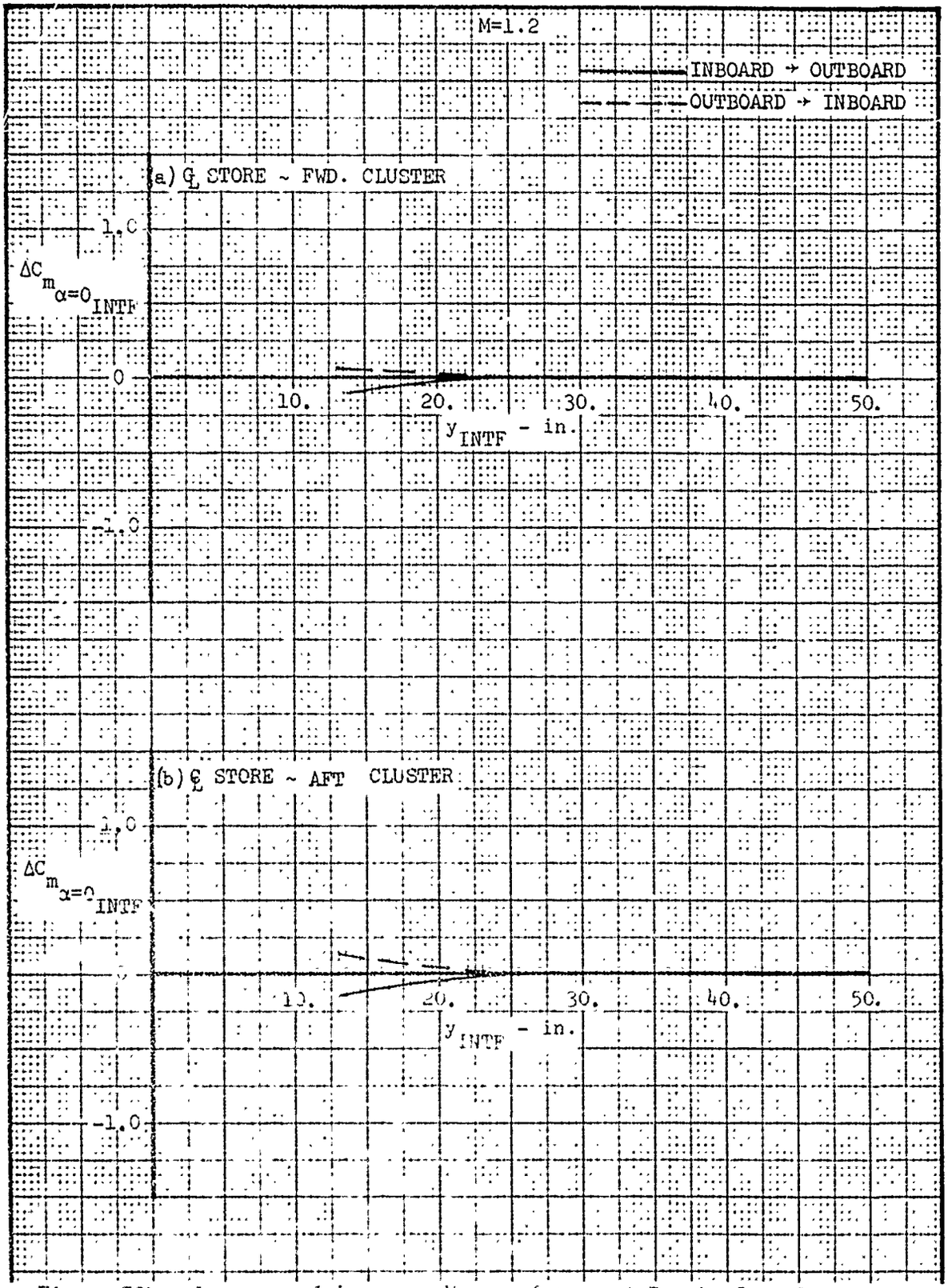


Figure 751. Incremental Pitching Moment Intercept Due to Interference - Centerline Store at M=1.2

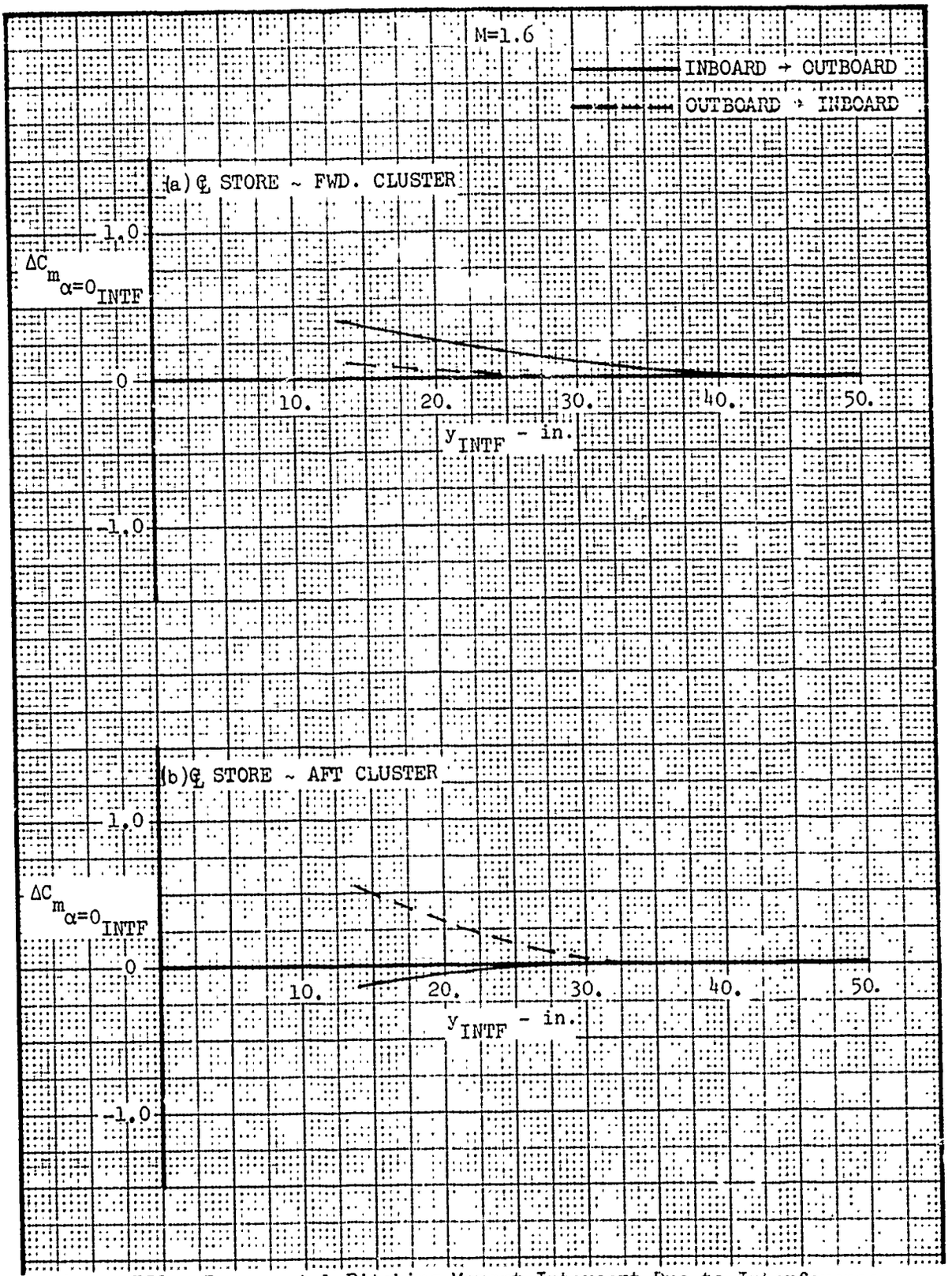


Figure 752. Incremental Pitching Moment Intercept Due to Interference - Centerline Store at M=1.6

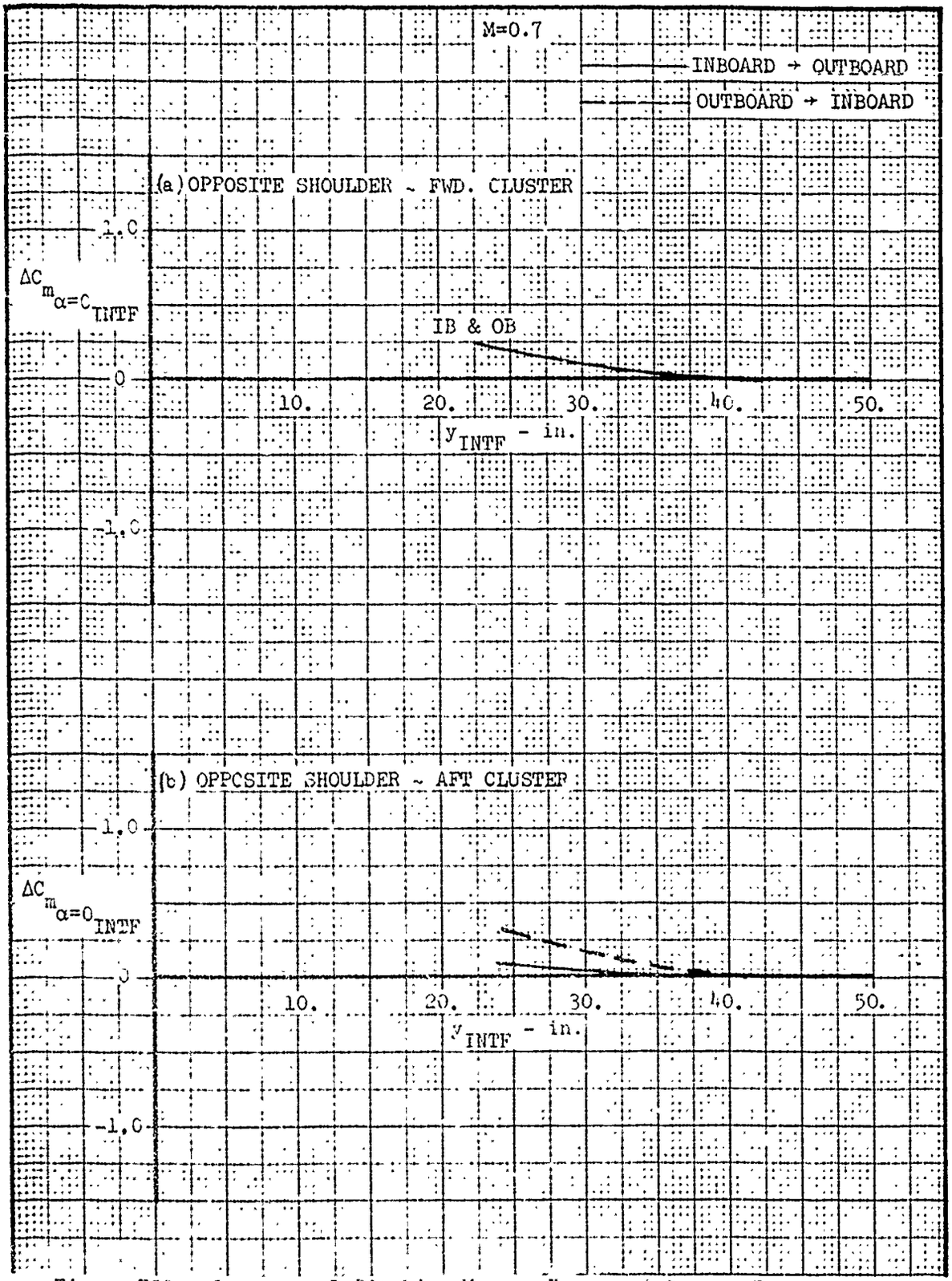


Figure 753. Incremental Pitching Moment Intercept Due to Interference - Opposite Shoulder at M=0.7

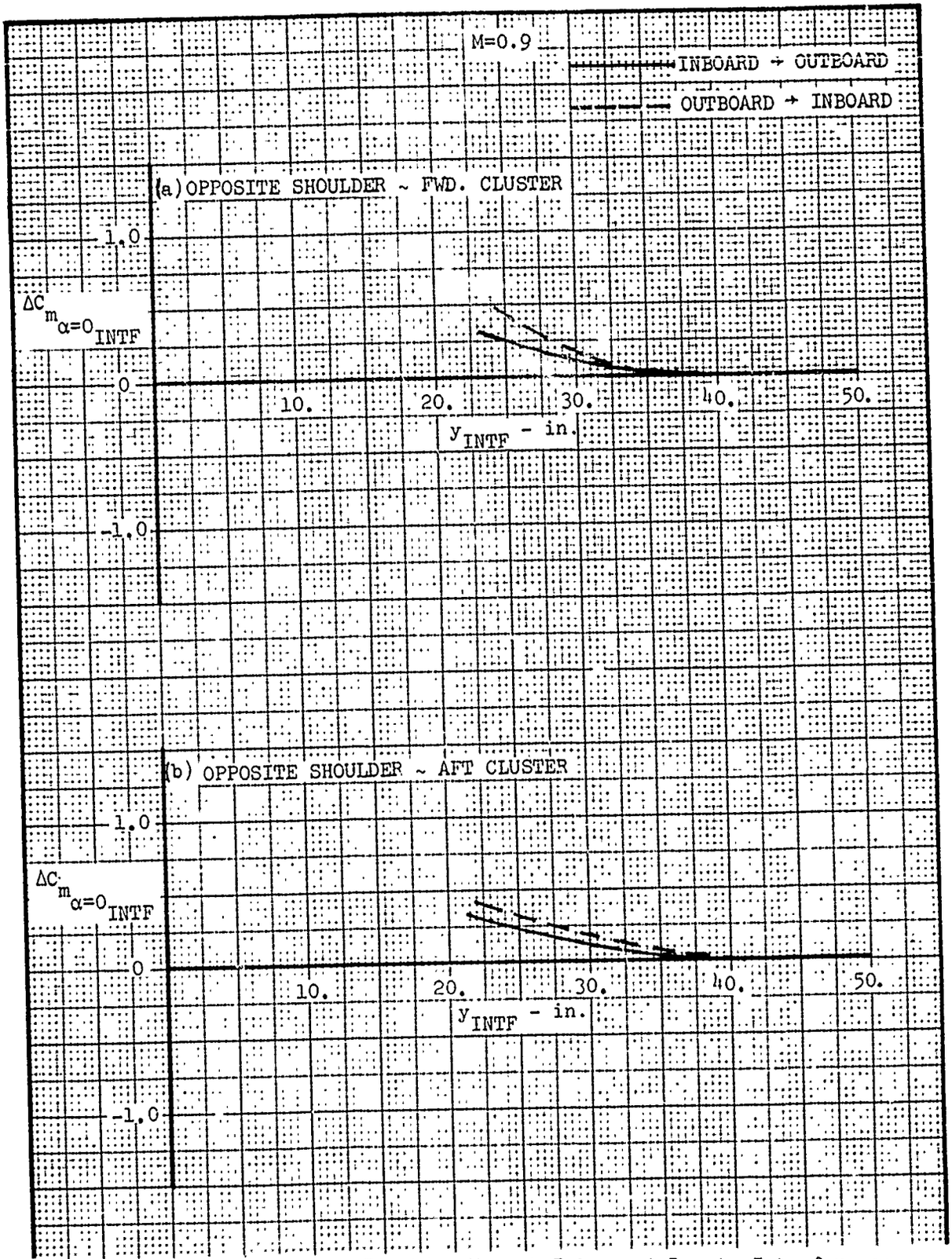


Figure 754. Incremental Pitching Moment Intercept Due to Interference - Opposite Shoulder at M=0.9

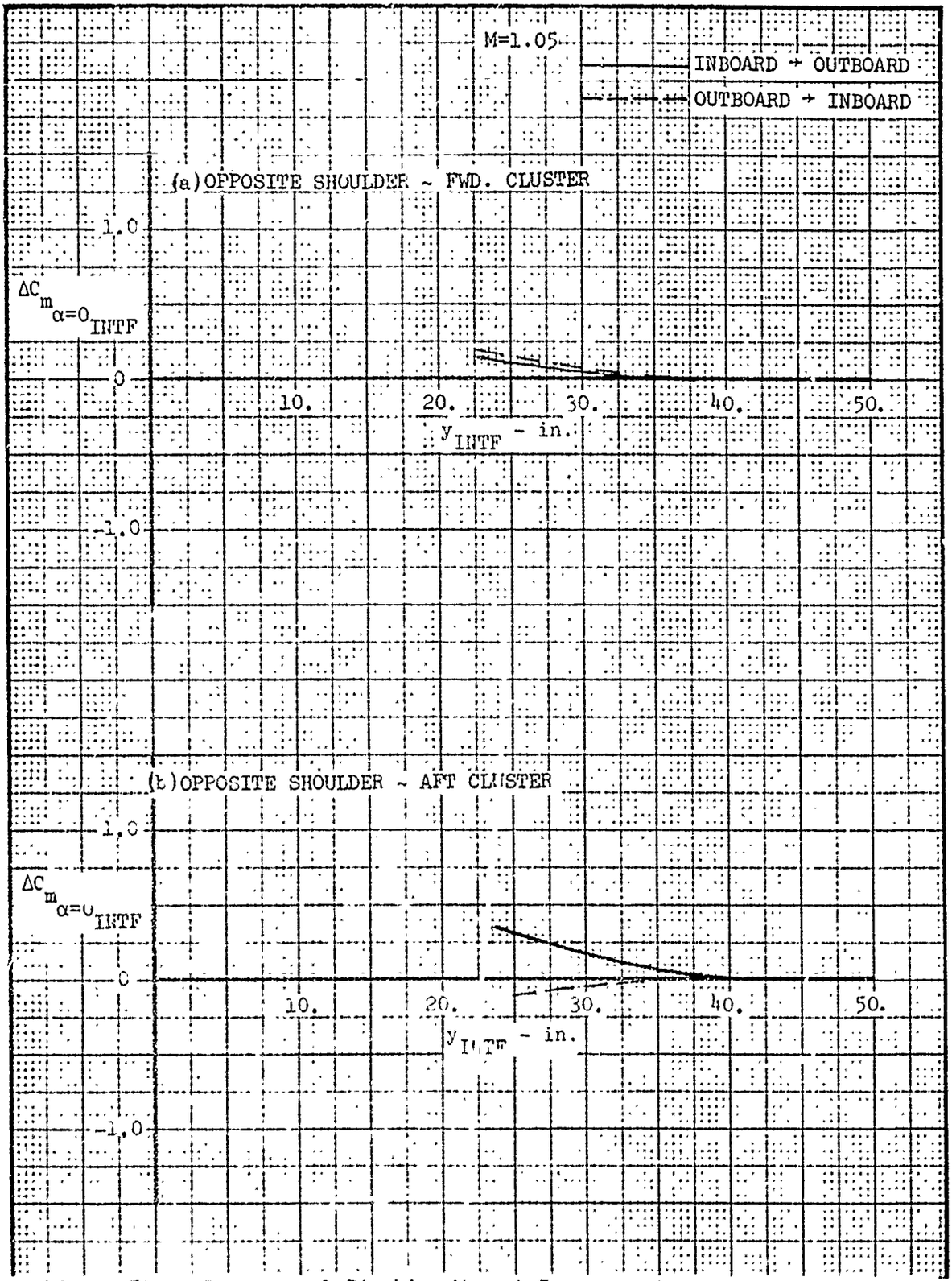


Figure 75. Incremental Pitching Moment Intercept Due to Interference - Opposite Shoulder at M=1.05

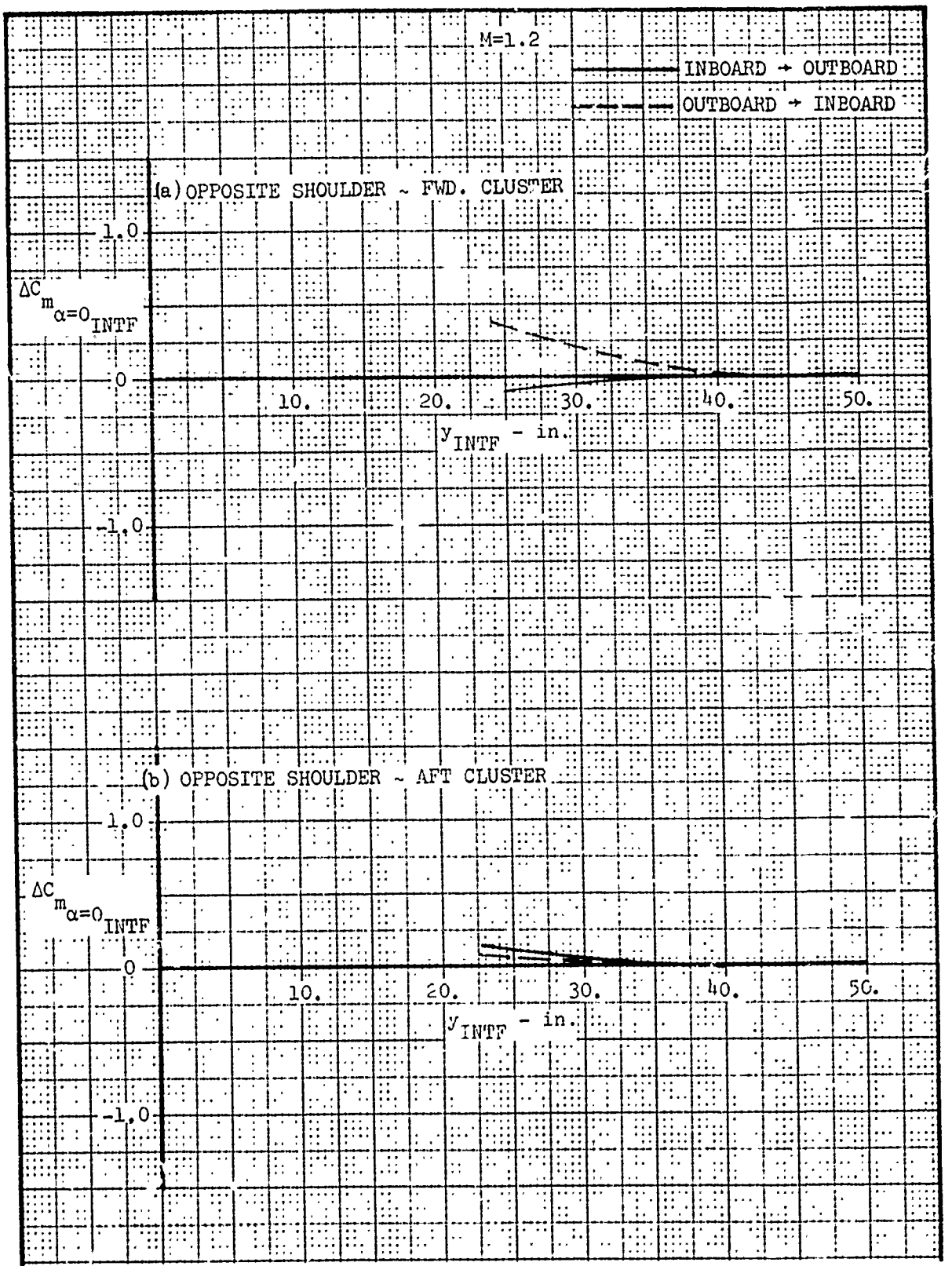
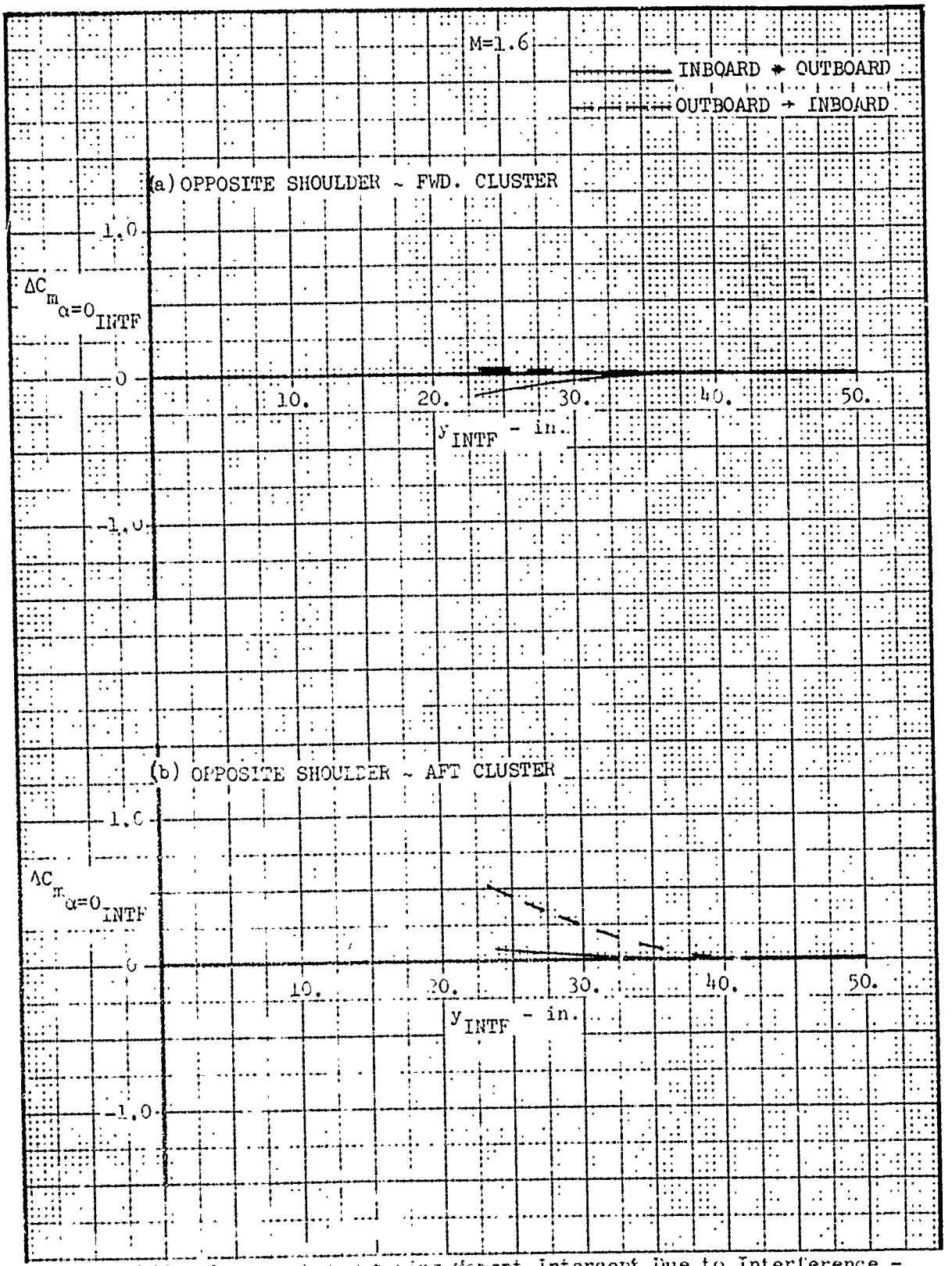


Figure 756. Incremental Pitching Moment Intercept Due to Interference - Opposite Shoulder at M=1.2



Figur 75. Incremental Pitching Moment Intercept Due to Interference - Opposite Shoulder at M=1.6

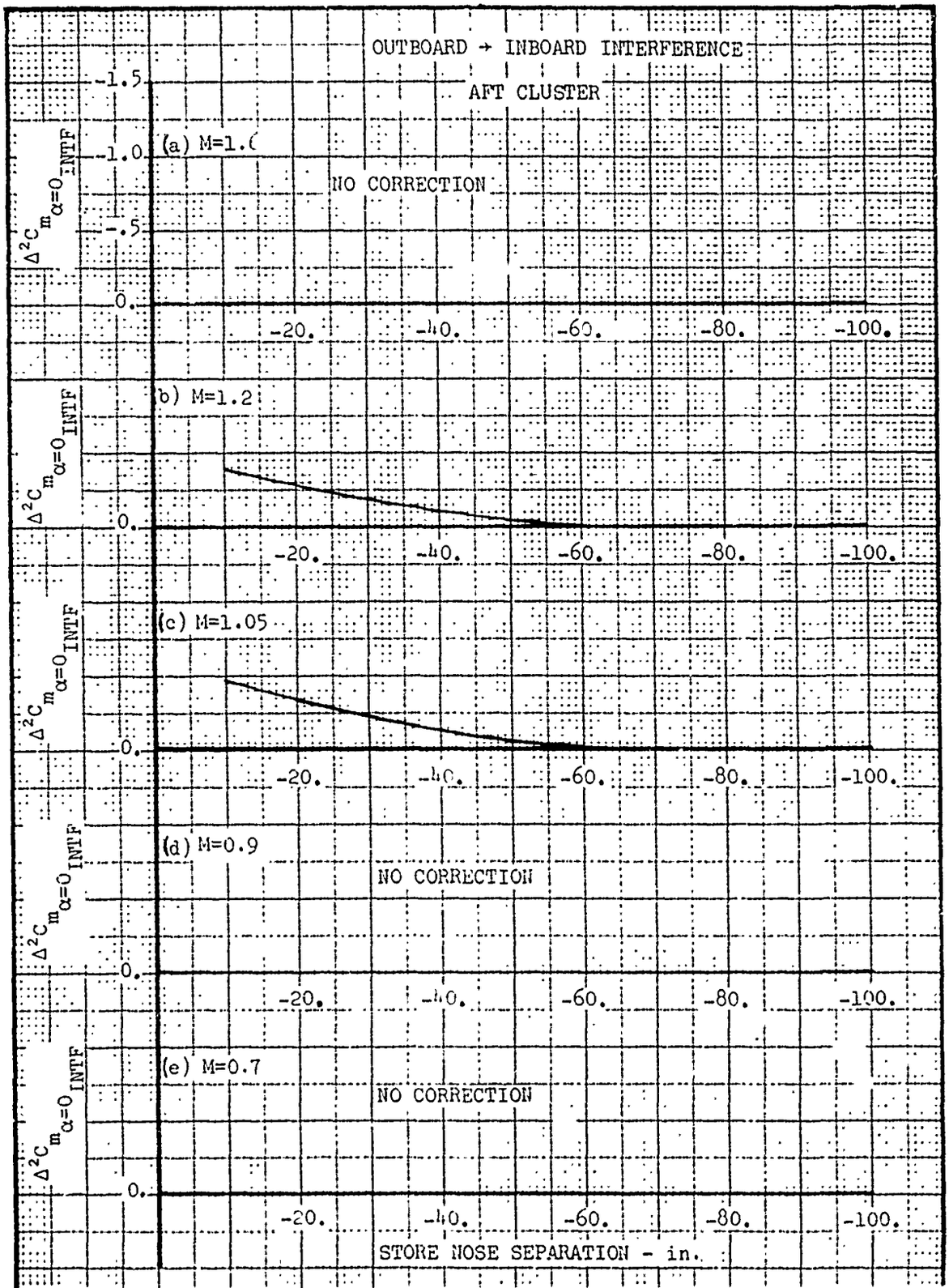


Figure 758. Incremental Pitching Moment Intercept Due to Interference - Outboard to Inboard Interference Correction for the Aft Cluster

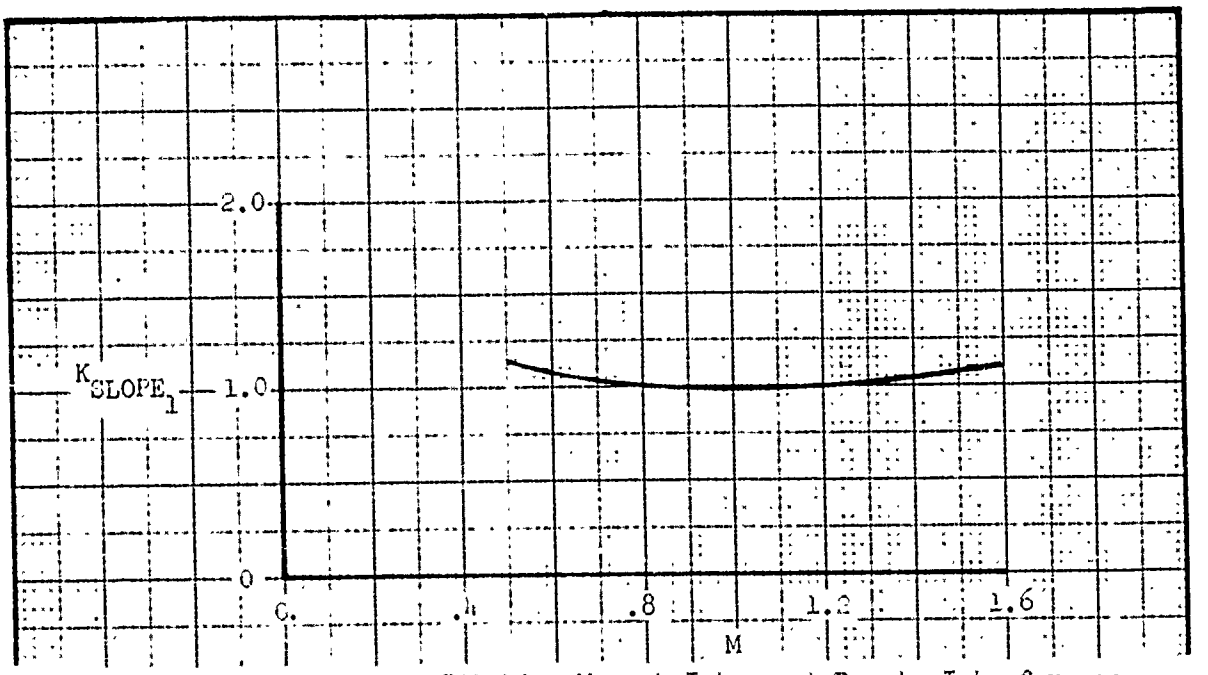


Figure 759. Incremental Pitching Moment Intercept Due to Interference - K_{SLOPE_1} for Combination Inboard and Outboard Interference

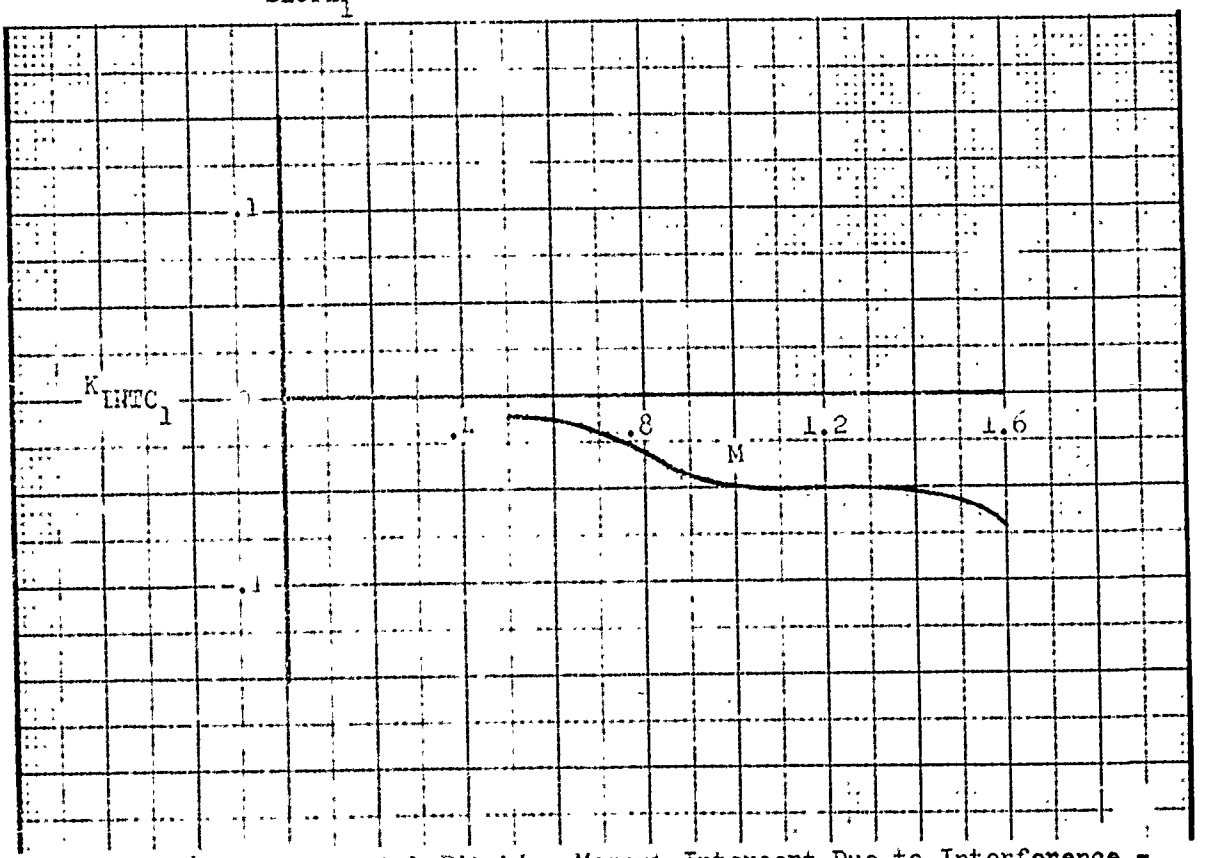


Figure 760. Incremental Pitching Moment Intercept Due to Interference - K_{INTC_1} for Combination Inboard and Outboard Interference